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# THE RECREATIONAL POTENTIAL OF THE ARCTIC NATIONAL WILDLIFE RANGE

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MASTER OF SCIENCE

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May, 1966

THE RECREATIONAL POTENTIAL OF THE

ARCTIC NATIONAL WILDLIFE RANGE

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## ABSTRACT

From May, 1961, to May, 1963, a study was conducted to investigate the recreational potential of the Arctic National Wildlife Range, which contains approximately nine million acres located in the remote northeast corner of Alaska.

This area was established by an Executive Order of the Secretary of the Interior in December, 1960, after bitter legal and political contentions between the state's rightist and the bureaucrat, the miner and the conservationist.

Two summer field trips demonstrated that hiking and back-packing are feasible as recreational features of the Arctic National Wildlife Range. Canoeing, mountain climbing, and photography prove to be additional attractions. Hunting and fishing also offer some promise.

The minimum estimated cost for two people to spend ten days in the area is 450.00 dollars which provides round-trip air transportation from Fairbanks.

Returned questionnaires from members of the Sierra Club, the Adirondack Mountain Club, and the National Campers and Hikers Association revealed that 18 per cent of the total sample group would be willing to expend a minimum of 200.00 dollars per person to visit the Arctic Wildlife Range from a departure point at Fairbanks.

However the impact of tourists' and recreationists' expenditures to visit the Arctic Range will not likely be a vital force in the State's economy. Rather, more importantly, the Arctic Range can help symbolize the wilderness character of Alaska as an amenity which will become increas-

ingly attractive to prospective State residents in the face of growing population pressures in other parts of the United States.

Additional field experience and further ecological studies are required to justify a detailed land use plan for this area, though present planning must provide a framework which can accommodate future trends and developments. No one resource can be managed to the exclusion of others.

It is recommended that a zoning system designating two major zones be employed to establish management guidelines. One zone of approximately 3,500,000 acres is recommended for inclusion in the National Wilderness Preservation System according to the provision of the Wilderness Act of 1964. The second zone is oriented toward more utilitarian management to include general recreation and oil and gas exploration.

## ACKNOWLEDGEMENTS

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Dr. David Klein, Leader, Alaska Cooperative Wildlife Research Unit, critically read the thesis and participated in the field work. I am also indebted to Dr. Klein for the inspiration of his high ideals as an individual as well as a scientist.

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Recognition is directed toward the following organizations who cooperatively participated in a questionnaire survey used in the study of the thesis problem: the Sierra Club, San Francisco, California; the Adirondack Mountain Club, Gabriels, New York; the Green Mountain Club, Rutland, Vermont; and the National Campers and Hikers Association, Buffalo, New York.

I am richer because of the many stimulating and enlightening discussions enjoyed with my fellow students, John Burns, David Chesemore, Keith Koontz, and Frank Day.

This project has also provided for me the occasion to meet an exceptionally versatile and colorful personality, Bob Burkholder, who during the time of this study was Predator Control Agent and pilot, United States Fish and Wildlife Service, Anchorage.

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# INTRODUCTION

In the last decade, the increase in visitations to various kinds of State and Federal outdoor recreational areas has ranged from 90 to over 300 per cent (Crafts, 1964). Though most of this activity is concentrated on developed recreational sites, the wild and more remote expanses also give evidence of increased use.

Formerly, individuals could find the solitude and serenity of nature in local areas, but now they are forced into more distant and isolated country to satisfy demands for these same qualities. In 1964 an estimated one-quarter million visits were recorded at the Boundary Waters Canoe Area, the well-known wilderness of northern Minnesota and southwestern Ontario. Only a fraction of this use occurred in 1946 when 29,000 visits were recorded. This upward trend continues with estimates that visitation will triple in 20 years. Along with this increased use come new problems--more houseboats and tent villages circumventing the ban against new resorts, overuse of portages and campsites along favorite canoe routes, and the unauthorized use of logging roads by various trail vehicles and snowmobiles (Izaak Walton League, 1965). The prodigious increase in human population, the increase in per capita real income, and leisure time, as well as the constant improvements in transportation, all contribute to a multiplying need for additional outdoor recreational areas. Federal, state, and local governments within recent years have taken vigorous strides toward the preservation and acquisition of appropriate recreational and wilderness areas.

It was within this setting that the Arctic National Wildlife Range was created on December 6, 1960, by an Executive Order of Secretary of the Interior, Fred A. Seaton. The Bureau of Sport Fisheries and Wildlife of the United States Fish and Wildlife Service was given administrative responsibility for this nine-million acre area located in the remote northeast corner of Alaska (Fig. 1).

For many months prior to the Executive Order, Secretary Seaton had consistently maintained that it would be preferable if the Range were created by Congressional action, a procedure which would allow that mining rights be granted within the Range. Such a bill was presented to both the Eighty-sixth and Eighty-seventh Congresses, but it did not pass primarily because of the rigid opposition of the Alaska Congressmen who felt that the State's best interest could not be served by a wildlife reserve in the north even though provisions for mining were included (Fairbanks Daily News-Miner, December 7, 1960). The primary emphasis of this Bill authorizing the establishment of the Range was directed toward the preservation of wildlife and wilderness values (Appendix B). It was recognized that the defense requirements of the nation were of paramount importance, consequently any future operations of the Department of Defense in the area were not to be affected. Furthermore, other uses--mining, oil exploration, and scientific studies--were also permitted if they did not impair the intent of the legislation. With but a short time remaining before the incoming Democratic administration and with much vigorous public support, Secretary Seaton, over the opposition of the Alaska Congressmen, chose to create the Range and thereby forfeit

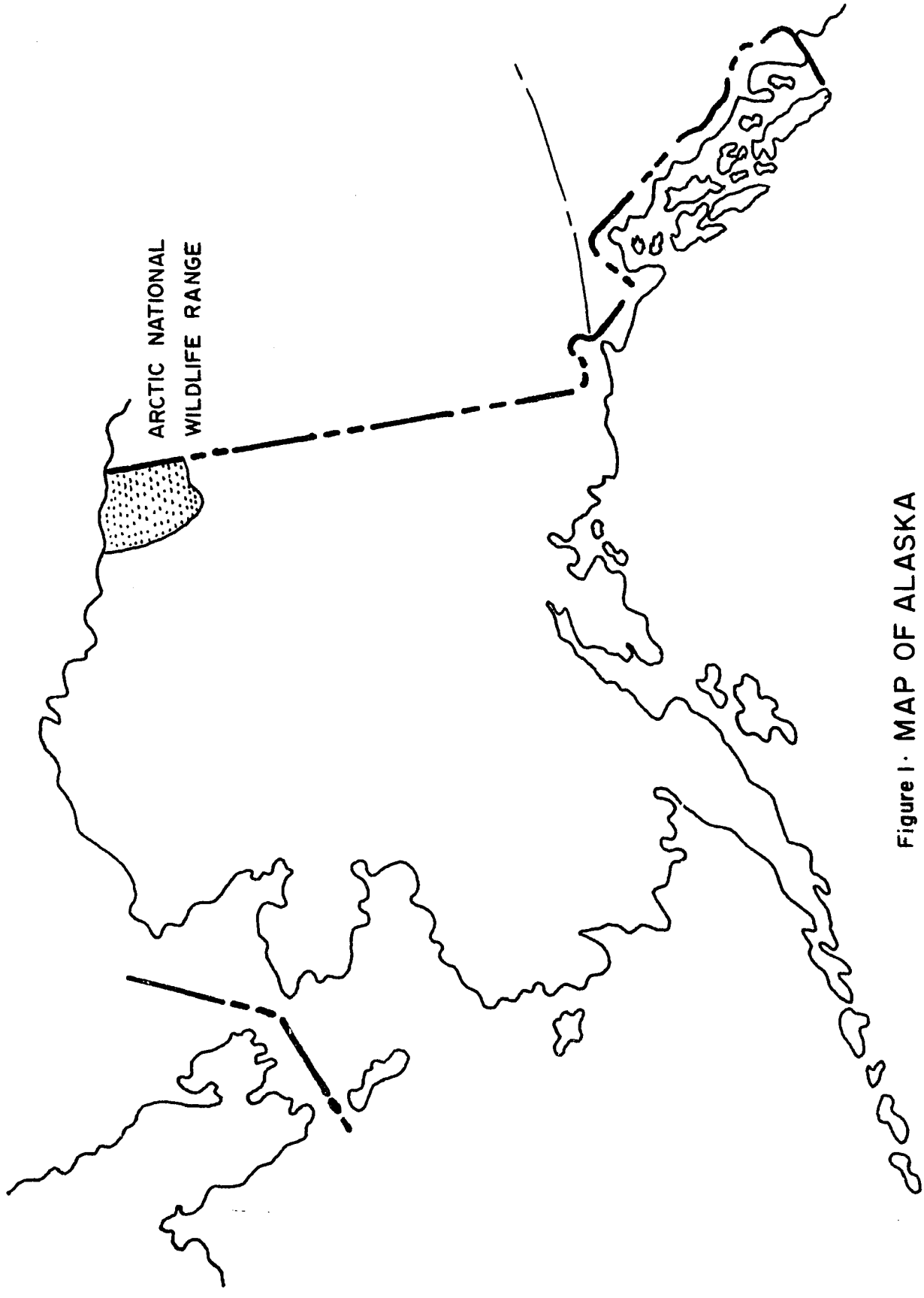



Figure 1· MAP OF ALASKA

the granting of any mining rights, a legal consequence of the Executive Order.

Generally the purpose of the Executive Order creating the Arctic Range was to set aside a portion of undisturbed Alaskan Arctic while there was still opportunity. Just as the creation of national reserves in the United States during the late eighteen hundreds kept areas from an expanding industrial complex, so it was deemed necessary to set aside areas in presently undeveloped Alaska. Secretary Seaton in 1957 indicated support of the Range, "...to provide a wildlife management area and to preserve the area for scientific and collateral recreation and wilderness values" (Living Wilderness, Autumn, 1957).

The study reported herein was initiated at the University of Alaska to provide essential information relative to the successful future management of the Arctic National Wildlife Range. The objectives of the study were: 1) to determine the magnitude of the recreational resource in the Arctic Range, 2) to determine public demand for this resource, and 3) to determine the degree of compatibility between recreation and other land uses.

During the summers of 1961 and 1962, I spent approximately 45 days in the Range. The first visit to the area was in late May, 1961, while assisting in a caribou census conducted jointly by the Alaska Department of Fish and Game and the U. S. Fish and Wildlife Service. During this period the writer gained an initial impression of the entire area, though most of the time was spent on the north slope of the eastern Brooks Mountain Range between the Okpilak and Canning Rivers where caribou were calving.

During July and August, 1961, David L. Chesemore, Graduate Research Assistant at the Alaska Cooperative Wildlife Research Unit, and I made a trip to Lobo Lake located in the Upper Sheenjek Valley. The purpose of this ten-day, two-man trip was to investigate the recreational possibilities in the Sheenjek Valley. In July, 1962, Frank B. Day, Graduate Research Assistant at the Wildlife Research Unit, and I completed in ten days a round trip hike of about 70 miles from Lake Peters southwesterly to the Canning River. The following 16 days a three-man party, David R. Klein, Leader of the Alaska Cooperative Wildlife Research Unit; Gary Kenwood, photographer; and I, hiked 110 miles from Lake Peters to Lobo Lake via the Hulahula and Sheenjek River Valleys. These trips indicated the feasibility of backpacking and hiking as recreational activities of the Arctic Range.

A questionnaire survey was also utilized in the study. The questionnaire was drawn up and sent to various members of conservation organizations selected because of their inherent interest in outdoor recreation. Additionally, a short survey was conducted in the City of Fairbanks to determine local interest and knowledge of the study area.

## ESTABLISHMENT OF THE AREA

### Early History

The earliest expeditions to northeast Alaska were confined to the summers when the coastal waters of the Arctic Ocean were free of ice. In 1826 an English expedition led by Sir John Franklin reached the coast of the present Arctic Wildlife Range by following the coast of the Arctic Ocean westward from the mouth of the Mackenzie River (Leffingwell, 1919). This expedition was responsible for the place names of Camden Bay, Beaufort Bay, Canning River, and numerous others. Point Demarcation was so named as it separated the British (Canada) and the Russian (Alaska) dominions.

Other English expeditions followed Franklin. Historical records indicate that whaling ships proceeded east of Point Barrow for the first time in 1854 (ibid.). During subsequent years the ships ventured farther east until in 1889 the first whalers were reported at Herschel Island, Canada. Some of these whalers allegedly traveled to the Yukon River from Herschel Island by way of the Firth River. By the early 1900's various scientific and prospecting parties had crossed the area now designated as the Arctic Wildlife Range. One of the more notable of these adventures was the exploration of Dr. R. M. Anderson who accompanied Stefansson on an arctic trip in 1908 (Stefansson, 1913). Anderson spent the winter of 1908-1909 with Eskimos in the Barter Island area and was the first white man to cross the divide between the Hulahula and Chandalar Rivers (Leffingwell, op. cit.). Leffingwell, beginning in 1905, conducted an intensive survey of the Canning River area for the U. S. Geological Survey.

The Chandalar-Sheenjek drainages were mapped by J. B. Mertie in 1926 (Mertie, 1930).

## Formulation of the Concept

Robert Marshall's Recommendation. - - Various people contributed to the mass of accumulating ideas which eventually led to the creation of the Arctic Wildlife Range; however, the initial concept is most correctly credited to Robert Marshall. Marshall (1956) as a youth developed a profound appreciation for nature while spending the summers in the Adirondacks with his distinguished New York City family. These early experiences were influential in Marshall's later decision to become a forester. During the summer of 1929 while yet a graduate student, Marshall (1933) had the opportunity to visit the Koyukuk drainage in Alaska to study tree growth at the northern timberline. He was so dramatically impressed by this unknown Alaskan wilderness that he made three succeeding trips to learn more of the area and the natives. Marshall (1936) who was convinced both of the essential qualities of wilderness in man's life and the ability of northern Alaska to supply these qualities wrote:

> Because the unique recreational value of Alaska lies in its frontier character, it would seem desirable to establish a really sizeable area, free from roads and industries, where frontier conditions will be preserved. Fortunately, this is peculiarly possible in northern Alaska, for economic and social reasons. Economically, the population is so scattered that airplane transportation is the only feasible means of mechanical conveyance, and auto roads could not possibly justify their great cost. At the same time, the country is far too remote from markets for successful industry. Sociologically, the country of northern Alaska is inhabited chiefly by native populations which would be much happier, if United States experience is any criterion, without

> either roads or industries. Therefore I would like to recommend that all of Alaska north of the Yukon River, with the exception of a small area immediately adjacent to Nome, should be zoned as a region where the federal government will contribute no funds for road building and permit no leases for industrial development.
>
> Alaska is unique among all recreational areas belonging to the United States because Alaska is yet largely a wilderness. In the name of a balanced use of American resources, let's keep northern Alaska largely a wilderness.

Marshall's writings, including a best-seller, Arctic Village, published in 1933, brought a great deal of public attention to this previously little-known area.

National Park Service. - - The National Park Service for years has tried to maintain a comprehensive knowledge of all Alaska--its natural resources, human resources, and its economy. Intensive work was accomplished over a period of years with what was termed the Alaska Recreation Survey, which designated places suitable for establishment within an Alaska park system (National Park Service, 1955). One of the more important findings was that of an arctic international wilderness area in northeast Alaska. Much of it was envisioned in Canada but a considerable area was in Alaska. George L. Collins, Chief, State and Territorial Recreation Division, and Lowell Sumner, biologist, both with Region Four, National Park Service, thought of this immense area as a piece of arctic wilderness that should be maintained as such. The genesis of a specially designated area was in the minds of Collins and Sumner influenced by Marshall, though the area is one Marshall never saw (Collins, 1964).

Though much fanfare from supporters of the Range accompanied Secretary Seaton's announcement of the December 6, Executive Order,

certainly public pressure and lobbyists were not solely responsible for the Secretary's action. Rather, a more substantial justification for his action came from recommendations of professional scientific reports and papers, many of which were prepared by the National Park Service.

Influence of the Sierra Club. - - The Sierra Club with its headquarters in San Francisco has a worldwide membership of some 35,000 people, many of them highly esteemed in their respective fields. This club is dedicated to the cause of conserving wild natural areas for the use of both present and future generations.

In 1953 a Sierra Club Bulletin was published supporting a reserve in the northeast corner of Alaska as proposed by the National Park Service. In this bulletin, Collins and Sumner (1953) wrote:

> For the immediate present the most pressing need is to establish and maintain for scientific use an undisturbed research area of adequate size in the heart of the last and greatest remaining Arctic wilderness region. For the future needs of Alaska and the entire nation, this superb area should be planned and dedicated now for perpetual preservation as a scientific field laboratory and also for the education, enjoyment and inspiration of all outdoor minded people.
>
> Today there is every reason to believe that with adequate protection this part of northeast Alaska will continue indefinitely as the habitat of a rich supply of game. Thus the region offers science probably the best opportunity of any place in Alaska, if not the whole of North America for studying the processes by which these other arctic animals maintain their numbers through the natural checks and balances of climate, food supply and predation.

Northeastern Alaska was recommended as the most probable site for such a reserve as it provided an adequate cross section of varied arctic terrain with its associated flora and fauna. The area was perhaps the most completely undisturbed yet accessible wilderness area in North

America. The proximity of the area to Canada was also favorably recognized. Perhaps the Canadians would withdraw an adjacent area and thus add significantly to the total size of the reserve.

Dr. Olaus Murie. - - Probably no man expended more effort in supporting the establishment of the Arctic National Wildlife Range than did Dr. Olaus Murie. Murie, formerly Director of the Wilderness Society, a national organization with headquarters in Washington, D. C., first visited the eastern Brooks Range with his brother in 1922-1923 while a biologist with the Biological Survey. Since that time Dr. Olaus Murie (1963) re-visited northeastern Alaska on other different occasions for recreational and scientific purposes. Upon hearing discussion of a possible wildlife reserve in northeastern Alaska, Murie talked and corresponded with George Collins and Lowell Sumner regarding their work in the area. In 1956 from May 31 to August 5, Dr. and Mrs. Murie camped in the upper Sheenjek River Valley. Accompanying them were Dr. Brina Kessel from the University of Alaska, George Schaller from the University of Wisconsin, and Robert Krear of the National Park Service.

After the trip Dr. Murie met with different Alaskan groups to discuss the possibility of a reserve. In 1957 the Muries, who then lived in Wyoming, received invitations from Alaskan organizations to come back and further explain their program. They responded to the invitations and spent most of the summer in Alaska giving illustrated lectures with both slides and movies to garden clubs, sportsmen's associations, Chambers of Commerce, Boy Scouts, historical societies, and other various groups. Dr. Murie was also interviewed on radio and television throughout

Alaska. Later he took the opportunity to speak about the proposed Arctic Wildlife Range in other states as well as in Washington, D. C. (Murie, 1963).

The respect Dr. Olaus Murie had earned from a wide field of acquaintances was largely responsible for his successful efforts in supporting the creation of the Arctic Wildlife Range. He could talk with equal effectiveness to both the common man or the accomplished politician. Certainly much credit for the Arctic Wildlife Range rightly belongs to Dr. Murie.

## Concept Supported and Bill Adopted

National Conservation Organizations. - - In addition to the efforts of the Wilderness Society and the Sierra Club in the early fifties, other national conservation organizations began to rally with vigorous support for the establishment of the Arctic Wildlife Range. Both the New York Zoological Society and The Conservation Foundation, also of New York, financially assisted the 1956 summer studies in the Sheenjek Valley by Dr. Murie and his group (Committee on Interstate and Foreign Commerce, 1960, p. 56). Dr. F. Fraser Darling (1956), conservationist, associated with The Conservation Foundation, wrote regarding the area in northeast Alaska: "The United States and Alaska would scarcely make a better investment for it is the grandest piece of wildlife country in the north." At their 1956 annual meeting the delegates of the National Wildlife Federation officially gave their endorsement to the proposal of setting aside an arctic wildlife area (Committee on Interstate and Foreign Commerce, 1960, p. 297). In May 1958, the Izaak Walton League in its annual convention commended by resolution the

action of Secretary of the Interior Seaton, who, in 1957 indicated that he intended to take steps to set aside some of Alaska's northland (Committee on Interstate and Foreign Commerce, 1960, p. 38). The Wildlife Management Institute was also influential in supporting the proposal.

Alaskan Organizations. - - Doubtless the most rousing enthusiasm and optimism responsible for the ultimate reality of the Arctic Wildlife Range originated with the Tanana Valley Sportsmen Association of Fairbanks, an affiliate of the Alaska Sportsmen Council. This group first heard talk of a possible wilderness area in northeast Alaska in 1952 (Committee on Interstate and Foreign Commerce, 1960, p. 292). At that time the proposal was generally opposed, locally, as it seemed to provide merely for a scientific study area to be used only by a few scientists. However during the succeeding years the idea was expanded, becoming less restrictive, and consequently attracted an increased number of supporters. After his 1956 experience in the area, Dr. Murie was invited to speak to the Tanana Valley Sportsmen Association on behalf of the proposed Arctic Wildlife Range. On May 14, 1957, the Association members agreed that sufficient validity existed for the creation of the Arctic Wildlife Range. The club requested that the Administrator of the United States Fish and Wildlife Service in Alaska take the necessary action to establish the Range through designation by the Secretary of the Interior (See Appendix A).

The Fairbanks Daily News-Miner took a relatively early stand in favor of a wildlife reserve (Committee on Interstate and Foreign Commerce,

1960, p. 40). Numerous editorials and articles appeared pointing out the wisdom of saving some of Alaska's remote wilderness from the wave of commercial and industrial engulfment. On different occasions the paper directed pointed criticisms toward politicians and State administrators who opposed the Arctic Range proposal.

The Fairbanks Garden Club and the Fairbanks Chamber of Commerce also upheld the proposal to create a wildlife reserve (Committee on Interstate and Foreign Commerce, 1960, p. 17). Two other Alaskan groups which took an affirmative position include the Anchorage Chapter of the Izaak Walton League and the Alaskan Federation of Women's Clubs (Seaton, 1959). The Alaska Conservation Society, though not organized until February 1960, provided effective and timely support for creation of the Arctic Range during a most critical period.

## The Bill Introduced

Almost two years had passed since Secretary Seaton had announced that he intended to set aside a wildlife reserve in arctic Alaska. During this period the Secretary was encouraged by the continuous staunch backing of numerous individuals and groups. But, as to be expected, opposition was likewise accumulating especially among the mining interests.

Secretary Seaton could have set aside the Arctic Range at any time by authority of the Executive Order itself without the legislation of Congress (Committee on Interstate and Foreign Commerce, 1960, p. 18). This possibility had two alternatives: 1) he could permit mining under the existing mining laws or 2) he could completely close the area to

mining activity. The United States Fish and Wildlife Service advised the Secretary that provisions of the first alternative would be entirely incompatible with the establishment of the Arctic Range. Recognizing that mining rights should not be totally curtailed, especially in the new and undeveloped State of Alaska, Seaton felt that subsurface mining rights should be granted within the area. This broader provision, however, required legislative action by Congress. At the request of the Secretary, Senator Warren G. Magnuson of Washington introduced to Congress on May 11, 1959, Senate Bill 1899 which provided for the Arctic Wildlife Range and the granting of subsurface mining rights within this same area (See Appendix B., Sec. 3b).

The Bill in the 86th Congress

Congressional Committee Hearings. - - Upon introduction of the Bill to Congress, it was referred to the Committee of Interstate and Foreign Commerce of which Senator Magnuson was Chairman and Alaska's Senator Bartlett was a member. The Senate committee conducted a hearing in Washington, D. C., June 30, 1959, to consider in fullest detail provisions of the pending legislation. Likewise a House committee held a hearing on the companion measure H. R. 7045. The House committee reported favorably on the Bill and indications were that the Bill would come to a House vote during the upcoming 87th Congress. Views expressed at the Congressional hearings follow:

A. Opposition Views

1. Withdrawal of nine million acres is an inconceivably large area for purposes of a wildlife range (Committee on Interstate

and Foreign Commerce, 1960, p. 68-69). Already in Alaska there was a total of some 14 million acres under Federal control for some type of wildland preservation. State representation in Washington argued that such a large withdrawal would hamper the State of Alaska's land selection program which was promulgated by the Statehood Act. If this area became a wildlife range, of course, it would not be available for State selection.

2. One of the most serious immediate impacts of the withdrawal would be the effects on Alaska's Highway Fund. With the advent of statehood and with the passage of the Alaska Omnibus Act, Alaska would be included within the provisions of the Federal Highway Aid Program. This Federal aid however depended on Alaska's ability to supply matching funds (Committee on Interstate and Foreign Commerce, 1960, p. 68). The formula determining the amount of Federal contribution included a provision under which the contribution is increased in an amount corresponding with the percentage of unappropriated and unreserved public lands contained in a State in which such land exceeds five per cent of the total area of all lands in the State (Public Law 85-767, Sec. 120, 23 U. S. C. 120). Accordingly before a withdrawal, Alaska was required to match 13.24 per cent of its Federal allocation, which amounted to 5.6 million dollars (Fairbanks Daily News-Miner, May 21, 1959). Should the nine-million acre reservation be created the uncommitted public lands in the State would be reduced, thereby increasing the matching requirement to 14.44 per cent or 6.2 million dollars. In this light the Arctic Wildlife Range would cost the taxpayers of Alaska an additional 600,000 dollars a year.

3. There is no need for this withdrawal for the purpose of preserving wildlife in an area so remote and inaccessible. A quote from the hearings, page 62, "The arctic is probably in little more peril of being trampled in future years than is the moon----------". A great abundance of Alaska wilderness exists: there is no need to be upset about some of it being left for future generations.

4. The proposal seems to be associated with the encroaching bureaucracy of the Federal government. The State administrators feel that they are well able and qualified to administer this area. Reference was made to the effect that the Alaska Department of Fish and Game could supply the trained personnel to work with the area much more reasonably than could the U. S. Fish and Wildlife Service whose staff was greatly reduced with the advent of statehood. (Committee on Interstate and Foreign Commerce, 1960, p. 62).

5. Mining rights are restricted. Though the Range would be created by legislation allowing the granting of subsurface mining rights, the mining interests were not agreeable to losing any surface rights. They were also dubious about the degree of leniency to accompany the granting of subsurface rights.

B. Supporting Views

1. The creation of the Arctic Wildlife Range provides an opportunity to save an arctic area large enough to be biologically self-sufficient. By taking advantage of this opportunity the United States can always have an arctic area where scientific studies can be conducted in a natural environment.

2. The wildlife should be furnished needed protection. The

big game species of the north necessarily require a habitat of a large and primitive character. With the further development of Alaska, it would be advisable to have this area for the protection of the polar bear, Dall sheep, caribou, wolverine, and other arctic species.

3. The Range would have scenic and wilderness values not duplicated elsewhere in our country. As the standard and pace of living on the American scene continues to increase, it is important that wilderness and scenic areas be preserved for their aesthetic and recreational values.

Those who supported the idea of a wildlife range were quick to refute the argument posed by the opposition that the withdrawal would cost the Alaskan taxpayers an additional 600,000 dollars per year to meet the requirements of the Federal highway matching fund. In 1943 Public Land Order 82 withdrew a huge area from northern Alaska as a petroleum reserve for the U. S. Navy (Committee on Interstate and Foreign Commerce, 1960, p. 33). The proposed Arctic Range consisted of five million acres which had already been withdrawn by PLO 82; therefore, only the remaining four million acres, and not the total acreage, affected the State's share of the highway fund, thus 275,000 dollars and not 600,000 dollars were involved (Committee on Interstate and Foreign Commerce, 1960, p. 21).

Alaskan Hearings Arranged. - - During the June, 1959, hearings in Washington, D. C., the question was raised as to how Alaskans themselves felt regarding the permanent dedication of nine million acres in northern Alaska for scenic, wildlife and wilderness purposes.

Certainly they could not be expected to make the long trip to Washington to express their views. Senator Bartlett recognized that hearings held in Alaska might shed revealing light on the controversial Bill; consequently, during the following weeks arrangements were made for a one-man Senate subcommittee, composed of Senator Bartlett, to hear testimonies on S. 1899 in the Alaskan cities of Ketchikan, Juneau, Anchorage, Seward, Cordova, Valdez, and Fairbanks (Committee on Interstate and Foreign Commerce, 1960, p. 37).

Hearings in Alaska. - - Senate subcommittee hearings on S. 1899 were held in the above mentioned Alaskan cities during the last 12 days of October, 1959. A total of 112 people expressed opinions as to the advisability of establishing the Range. Approximately two-thirds of these statements were from residents of the Fairbanks area where interest was especially keen.

To best present the complex of the many ideas expressed at these hearings, the testimonies either for or against establishment of the Range were analyzed and placed into reason classes. Admittedly it was impossible to categorize each testimony according to one specific reason, though a careful examination did reveal, in most cases, a primary emphasis. This primary emphasis was used to classify the entire statement. A description of each reason class follows:

A. Reasons for Approval

1. For future. This classification typifies those who have no immediate plans for developing the area. These people believe that it is their responsibility to currently save the area for future generations, who will have an increased interest and knowledge of the area,

and subsequently, these later generations will be able to devise a more appropriate management plan. Many supporters of this reason class were of the older age group.

2. Scientific value. Most of the individuals supporting this reason class are experienced in scientific research. Most of the support comes from the biological sciences. The general feeling is that the Arctic Wildlife Range is necessary as a control area for future scientific studies in the North American Arctic.

3. Recreational value. This represents those people who recognize the increasing need for recreational facilities in our present society. They would use the Range for the variety of recreational activities it furnishes. These people would encourage controlled hunting and fishing.

4. Wildlife value. These individuals hold that this area should be created to preserve Alaska's wildlife in the face of increasing human population pressures. They feel that wildlife should be preserved for the sake of wildlife. No hunting or fishing would be tolerated.

5. Wilderness value. This group seems to take more pleasure in knowing that the area exists rather than in feeling that the area has definite use. Aesthetic values are emphasized. This group would allow no construction within the Range boundaries.

6. Tourist attraction. These supporters are most interested in the present dollar. This group would favor the construction of lodges, service buildings, and numerous air strips.

B. Reasons for Disapproval

1. Impede mining. These individuals feel that even though

legislative action would be more favorable than an Executive Order, mining would still be so controlled that its future would be definitely limited.

2. Federal intervention. This group is of the opinion that the new State of Alaska can well handle its own affairs and that there is no need for more Federal bureaucracy.

3. Land withdrawal. These individuals hold that Federal land withdrawal would limit development of private enterprise in Alaska. Also this would possibly interfere with the State's land selection program.

4. Lack of information. This represents those who believe that not enough scientific information is known to warrant any action for setting the Range aside, so consequently, unnecessary legal procedure should be avoided.

Classifying the Alaskan hearings according to the above breakdown gives the following results:

| Reasons for Approval | Number of Statements | Reasons for Dissapproval | Number of Statements |
|---|---|---|---|
| For future | 14 | Impede mining | 16 |
| Scientific value | 12 | Federal intervention | 14 |
| Recreational value | 10 | Land withdrawal | 7 |
| Wildlife value | 8 | No validity | 6 |
| Wilderness value | 7 | Lack of information | 5 |
| Tourist attraction | 5 | | |

Of the 104 total statements recorded, 56 were in favor of the Range, while 48 were opposed to it. In a few cases the statement was not assigned to a specific reason class.

Status of Bill Remains Unchanged

Following the Alaskan hearings Senator Bartlett reported that he was disturbed about many features of the proposal to set aside nine million acres in northeast Alaska for a Federal Wildlife Range. The status of the Bill just prior to the 87th Congress was that it was still pending action in both House and Senate. However the Bill was on the calendar for a House vote as it had favorably passed the House subcommittee. In the Senate the Bill was in the subcommittee, though Senator Bartlett, Chairman, had arranged to meet with Secretary Seaton to discuss possible modifications of the Bill, especially regarding the size of the area (Fairbanks Daily News-Miner, December 31, 1959).

The Bill in 87th Congress

The Bill, having been reported favorably by the House subcommittee, was placed on the consent calendar of the House. This calendar consists of issues which are of lesser importance or non-controversial. When items of the calendar are called up periodically, a single objection can cause the measure to be passed over (Fairbanks Daily News-Miner, February 8, 1960).

During the early sessions of the 87th Congress, Alaska's Representative Rivers blocked the passage of the Bill on four different occasions by supplying the one all important objection. However in mid-February the Bill passed the House as Representative Rivers withdrew his objection (Fairbanks Daily News-Miner, February 14, 1960). He said, "I wasn't making enough progress so I let it go through. I felt our Senators will oppose it in its present form and any reduction in land area can be made by them."

In the Senate the Bill was still lodged in the Commerce subcommittee with both Alaskan Senators opposing it. On June 29, 1960, Senator Bartlett was reported to say the Bill to establish the Range was dead (Fairbanks Daily News-Miner, December 7, 1960). The Bill remained blocked at the end of the 87th Congress.

Range Established by Executive Order

On December 7, 1960, the same day that President-elect Kennedy announced Stewart Udall as the new Secretary of the Interior, Secretary Seaton created the Arctic National Wildlife Range by Executive Order. Secretary Seaton had been hopeful that Congress would follow his recommendation and create the Range by legislative action thus providing for the granting of subsurface mining rights. With but a short time remaining in office and with heavy public support, Seaton felt that he must take the step Congress refused to take. He said (Fairbanks Daily News-Miner, December 7, 1960):

> In these circumstances, I felt it my duty, in the public interest to move as promptly as possible to take the steps administratively which would assure protection and preservation of the priceless resource values contained in the proposed Arctic National Wildlife Range area.

As to be expected the State administration and the Alaska Congressmen were fervently displeased with the Secretary's action. Senator Bartlett said in reference to the withdrawal"....a deliberate attempt by the Secretary of the Interior to embarrass the new Kennedy administration" (Fairbanks Daily News-Miner, December 7, 1960). Also Governor Egan levied some pointed comment (Fairbanks Daily News-Miner, December 7, 1960):

I am amazed that the outgoing Secretary of the Interior would exercise such sweeping authority in the closing days of his tenure of office and also on the very day that the President-elect was expected to and did announce the name of the man who is to be the Secretary of the Interior during the forthcoming administration.

Today's actions are all the more a bitter pill because the Secretary has apparently prohibited mining location rights of citizens in the northern range areas. Existing federal law gives ample authority to the Secretary of the Interior to permit prospecting and mining rights in such areas.

Alaskans may once again thank the present national administration for retarding local control and development of Alaska's resources.

This same edition of the News-Miner also contained an editorial testifying to the public support which Secretary Seaton had:

In order to establish a range where Arctic wildlife could be perpetuated and simultaneously allow mineral and petroleum exploration and development operations compatible with wildlife preservation, the Department of the Interior prepared enabling legislation providing for joint use of the proposed Arctic Wildlife Range area. The Secretary of the Interior strongly urged Congress to enact this legislation, which was passed by the House, but later blocked in the Senate by Senators Gruening and Bartlett.

Senators Gruening and Bartlett and Representative Rivers had it within their power to obtain the Range for Alaska under the most favorable of conditions. Instead, they blocked the proposal at every turn and repeatedly agitated against it. If, in fact, we are now forced to accept the Arctic Wildlife Range under circumstances disadvantageous to mining and other development, it will be because our three Congressmen deliberately invited such an alternative.

Far from being a political move to embarrass anyone, we look on the move to establish the Arctic Wildlife Range as one reflecting the wishes of the majority of Alaskans, expressed over the years through organized groups and at the hearings on the matter conducted by Senator Bartlett in major cities of the state in the fall of 1959.

With such turmoil being precipitated from such a long, controversial issue, it is obvious that cautious and diligent efforts are

required for the formulation for any type of successful management plan to be applied to the area.

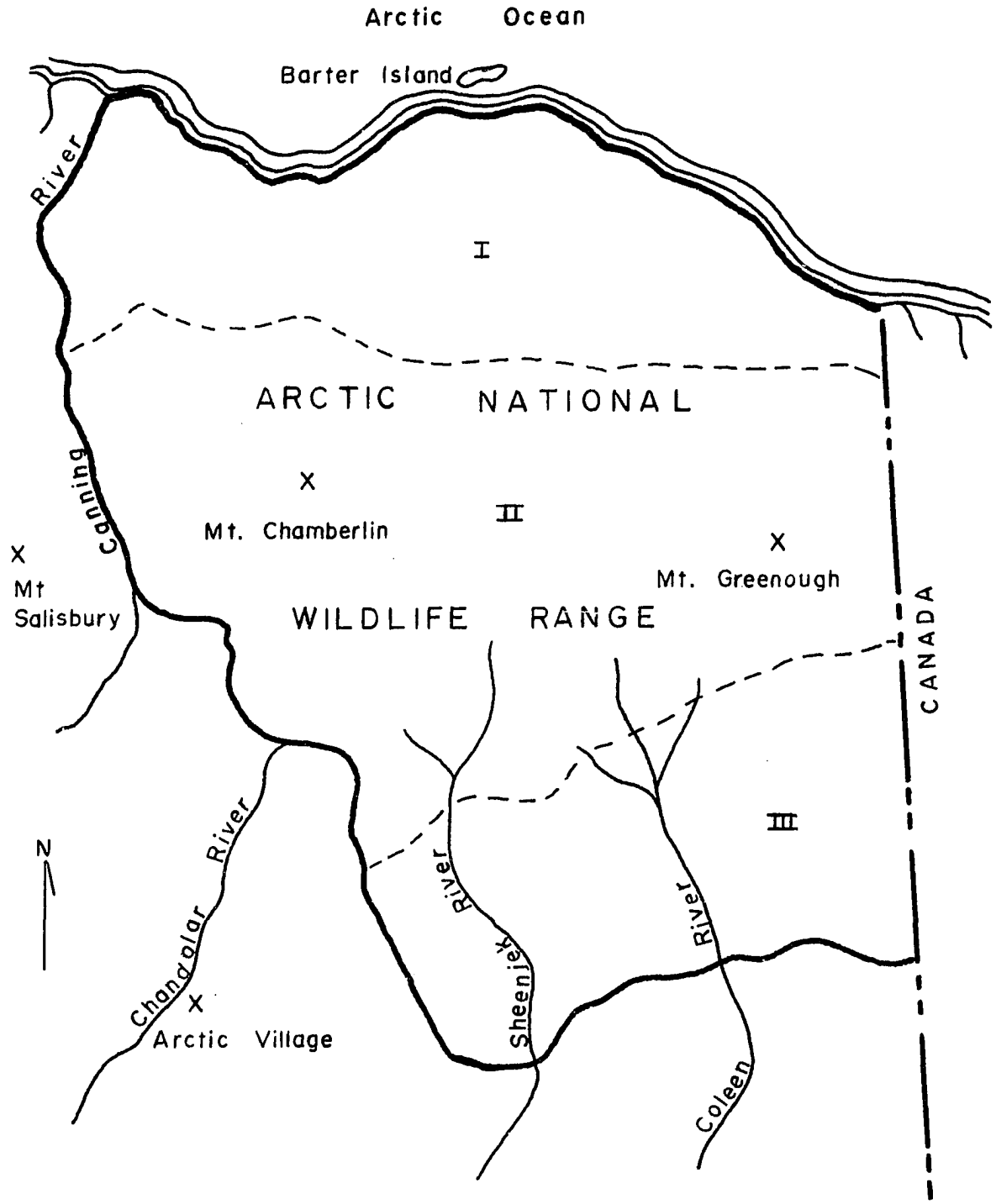
Figure 2. SOURDOUGH JACK SEZ: "Sounds to me like we better send some politicians up to this Arctic ice range long enough to cool off." (Fairbanks Daily News-Miner, December 7, 1960).

## PHYSICAL DESCRIPTION

### Location and Size

The Arctic National Wildlife Range consists of about 8,900,000 acres located in the extreme northeast corner of Alaska. The northern boundary is contiguous with approximately 140 miles of the Arctic Ocean coast line while the eastern boundary is the Canada-Alaska border. On the west the Canning River marks the limit of the Range. The south boundary extends from the headwaters of the Canning River across the east fork of the Chandalar River along Old Woman Creek to the confluence of Monument Creek and the Sheenjek River. From this point the boundary follows Eskimo Creek to its head and then extends across the Coleen River. This south boundary continues along Bilwaddy Creek easterly to the Canadian line (Fig. 3).

This remote northeast corner of Alaska serves as an area particularly well-suited for a wildlife and scientific area. The Arctic Range is composed of a diverse set of biological conditions. It contains three major biotic divisions, the arctic coastal plain, the mountains of the Brooks Range, and the northern-most limits of the boreal forests on the south slope of the Brooks Range. This area is remote and consequently not subject to the influence of encroaching civilization as are many other areas of Alaska. There are no permanent settlements within the Range. Barter Island is a village of about 100 people just off the north coast. Arctic Village, an Indian settlement of some 100 people, lies 30 miles outside the southwest corner of the Range. Fort Yukon with a population of about 700 people is approximately 125 miles south of the southern boundary. The Fairbanks area with its population of almost 50,000 people is 250 miles away.




Area I Arctic Coastal Plain
Area II Mountains of the Brooks Range
Area III South Slope — Brooks Range

Figure 3· MAP SHOWING BOUNDARY AND PHYSIOGRAPHIC AREAS OF THE ARCTIC NATIONAL WILDLIFE RANGE

Scale 1:1,584,000

A 100-mile common boundary between the Arctic Range and Canada makes possible an international reserve provided Canada would designate a similar area as was suggested in the hearings (Committee on Interstate and Foreign Commerce, 1960, p. 38).

The size of the Range was cause for much discussion during the months the Bill awaited action in Congress. In fact it was suggested that if the size of the proposed Range had been reduced, Congressional passage of the legislation creating the Range would have been much more likely. However those individuals supporting the creation of the Range for scientific reasons contended that in the far north where vegetation was particularly fragile, a nine million-acre area--the total area of Vermont and Connecticut--was necessary to provide an environment biologically self-sufficient (Committee on Interstate and Foreign Commerce, 1960, p. 326).

Terrain

The eastern portion of the rugged, geologically recent, Brooks Mountain Range delineates three general physiographic areas within the Arctic National Wildlife Range: the coastal plain, the foothills and mountains, and the south slope (Fig. 3).

The Coastal Plain. - - The coastal plain includes approximately one-fourth of the land area in the Arctic Range (Fig. 4). The plain is bordered on the north by the Arctic Ocean and on the south by the Brooks Range. It gradually diminishes in width from 80-90 miles on the west side of the Range to about 20-30 miles at the Canadian border, the east side of the Range.

There is only a slight break in the vertical profile at the coast

line; sometimes this break may be no more than one foot. From this height just above sea level the coastal plain rises to 1,000 feet in elevation where it intercepts the foothills. The grade of the Okpilak River is approximately 30 feet to the mile which is typical of the other drainages between the Canning River and the eastern border. The river banks are seldom more than ten feet high. Near the coast the rivers spread out over deltas that are several hundred yards wide (Leffingwell, op. cit.).

Much of the tundra is flat and generously sprinkled with shallow lakes and ponds. In some places large ponds are separated by such narrow bands of tundra that the water surface actually exceeds the land surface (National Park Service, 1954). The surface of the tundra features polygonal markings caused by the freezing and thawing action of water. These markings usually originate from frost cracks which sometimes run across a flat surface but usually are associated with some land surface feature, such as a gentle depression (Leffingwell, op. cit.).

The North Foothills. - - There is an undulating tundra upland between the heart of the Brooks Range to the south and most of the Arctic Coast to the north. The north boundary of this upland rises generally 15° - 20° from the flat coastal plain. From the Canning River to the east side of the Sadlerochit River these foothills are approximately 20 miles wide. They gradually decrease in width to 15 miles at the Okpilak River, and little of the upland remains at the eastern boundary of the Arctic Range. Here the coastal plain is most distinct against the bold face of the mountains.

Large expanses of ice several feet thick develop over the shallow braided channels of many of the rivers on both the north and south slope.

This ice formation, known as Aufeis, develops during the winter when the river flow is restricted by surface ice (Fig. 5). Consequently water is forced over the ice where it freezes and continues to accumulate until the spring thaw or until the river stops flowing (Koranda, 1961).

The Mountains. - - The main mass of the Brooks Mountain Range reaches across entire northern Alaska. The mountains are about 60 miles wide at the Canadian border and some 150 miles wide at the Canning River. Mount Michelson, 9,239 feet above sea level and Mount Chamberlin, 9,131 feet, are the highest mountains in the Brooks Range and lie within the Arctic Range. Glaciers are present on these mountains and also occur on some adjoining mountains to the south. Earlier glaciers have carved numerous valleys that wind northward to the Arctic Ocean, southward to the Yukon River and eastward to the Mackenzie River. Snow and ice slides have vertically striped the mountains with fans which occur at rather regular intervals. Many of the mountain peaks are jagged, with crags and dome-like formations being common occurrences (Fig. 6). The upper elevations of these geologically recent mountains are, from a distance, conspicuously bare of any vegetation, though closer observation does reveal that lichens and mosses are abundant.

Lake Peters and Lake Schrader are the only sizeable lakes that occur within the mountains of the Arctic Range. These lakes located at the base of Mount Chamberlin are joined by a narrow channel. They cover approximately 11 square miles and are nearly 6,000 feet below the adjacent mountain peaks.

The South Slope. - - The portion of the south slope in the Arctic

Figure 4. Terrain and vegetation of the arctic coastal plain.

Figure 5. Aufeis. Photo taken on July 28, 1961, approximately four miles northwest of Table Mountain.

Range is drained by three major drainages: the Coleen, the Sheenjek, and the Chandalar Rivers. These streams head at the north-south divide of the Brooks Range and flow southward into the Yukon flats.

The southern limit of the main mass of mountains is not so sharply delineated as is the northern limit. Gradually the sharp, barren and rugged characteristics of the mountains give way to a smooth, though steep surface, which supports a denser vegetative cover. This in turn gradually gives way to the boreal forests which extend down into the valley bottoms (Fig. 7).

Climate

The climate of the Arctic Range is one of severe temperatures and little precipitation. Because of the severity of the climate, most recreational activity will be confined to the summer months which are characterized by nearly continuous daylight. At this northern latitude the sun does not set from mid-May to late July.

During the 27 days of field work in 1962, the 24-hour extreme temperatures ranged from 32° F. on July 26 to 75° F. on July 20. Intermittent light rain showers were common, occurring on 18 of 27 days.

Figure 6. A rugged mountain peak typical of the eastern portion of the Brooks Range.

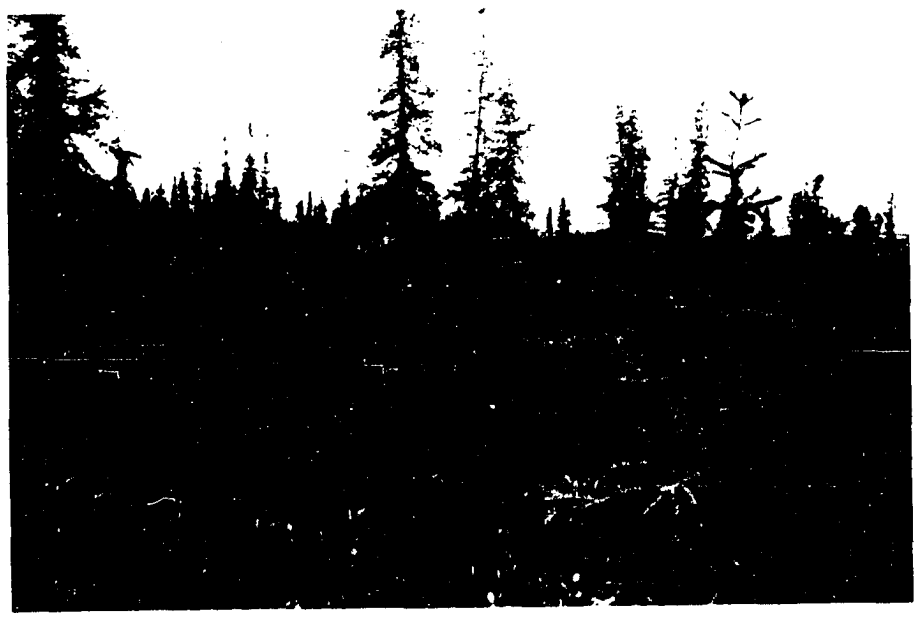


Figure 7. The boreal forests of the south slope.

TABLE 1. WEATHER DATA*
(U. S. Weather Bureau Files, Fairbanks and Anchorage, Alaska)

Monthly Averages at Fort Yukon and Barter Island

| | J | F | M | A | M | J | J | A | S | O | N | D | AVE. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Temperatures (°F.) | | | | | | | | | | | | | |
| Fort Yukon | -20.6 | -15.1 | .7 | 21.3 | 43.6 | 58.4 | 61.5 | 55.0 | 41.5 | 20.4 | -5.0 | -19,9 | 20.1 |
| Barter Island | -14.9 | -11.4 | -17.8 | -4.6 | 21.3 | 34.1 | 39.1 | 38.0 | 30.9 | 16.0 | -3.3 | -11.7 | 8.8 |
| Precipitation (inches) | | | | | | | | | | | | | |
| Fort Yukon | .41 | .35 | .28 | .17 | .30 | .68 | .96 | 1.20 | .81 | .57 | .45 | .33 | .54 |
| Barter Island | 1.10 | .37 | .16 | .17 | .15 | .39 | 1.76 | 1.11 | .70 | .54 | .15 | .14 | .56 |
| Snowfall (inches) | | | | | | | | | | | | | |
| Fort Yukon | 7.4 | 6.2 | 4.9 | 2.3 | .7 | 0.0 | 0.0 | T | 1.7 | 7.9 | 7.8 | 5.8 | 3.7 |
| Barter Island | 9.6 | 4.7 | 2.0 | 2.7 | 1.7 | 1.1 | .9 | 1.6 | 5.3 | 8.8 | 1.7 | 1.5 | 3.5 |

* Fort Yukon data is from Weather Bureau Summary Report, Climatological Data, 1931-1955. Barter Island data is from Weather Bureau Annual Reports, Climatological Data, 1959-1962.

TABLE 2. WEATHER DATA FROM McCALL GLACIER (MT. MICHELSON). (Mason, 1960)

Average Maximum and Minimum Extremes and Mean Temperatures in °F.

| | | Average Maximum | Extreme | Average Minimum | Extreme | Mean |
|---|---|---|---|---|---|---|
| 1958 | Mar | 1 | 27 | -13 | -24 | -6 |
| | Apr | na* | 32 | 0 | -13 | 8 |
| | May | 28 | 42 | 11 | -22 | 19 |
| | Jun | 45 | 56 | 29 | 20 | 37 |
| | Jul | 45 | 52 | 31 | 21 | 38 |
| 1957 | Aug | 40 | 56 | 29 | 18 | 35 |
| | Sep | 24 | 54 | 12 | -14 | 18 |
| | Oct | 18 | 40 | 4 | -24 | 11 |

* Not available

Precipitation (inches)

| | 1958 Mar | Apr | May | Jun | Jul | 1957 Aug | Sep | Oct |
|---|---|---|---|---|---|---|---|---|
| Snow | 0.7 | 0.6 | 0.6 | 1.3 | 2.3 | 1.2 | 1.6 | 1.4 |
| Rain | 0.0 | 0.0 | 0.0 | 1.6 | 0.1 | 0.2 | 0.0 | 0.0 |

## Vegetation

The plant communities of the Arctic Wildlife Range include a wide array of types extending from the spruce forests on the south slope to the lichens of the mountain areas. This vegetation illustrates the complex ecological relationships resulting from differences in substrate origin, differences in exposure and drainage, differences in stages of community succession, and other physical and biological interactions (Britton, 1957).

As is to be expected in cases of numerous controlling factors, widespread gradation of various species and types of vegetation occurs throughout the Arctic Range. Though critical limits of plant distribution do exist, i.e., spruce does not occur on the north side of the Brooks Range, there is a very wide geographical range of plant tolerances. A number of botanical studies have been conducted on the arctic slope. Included among these are the works of Koranda (1960), Spetzman (1951), and Wiggins and Thomas (1962).

## Wildlife

Some of the larger mammals found in the Arctic Wildlife Range include the arctic grizzly (Ursus horribilis richardsoni)[1], black bear (Ursus americanus americanus), polar bear (Thalarctos maritimus), moose (Alces alces gigas), stone caribou (Rangifer arcticus stonei), Dall sheep (Ovis dalli dalli), and gray wolf (Canis lupus tundrarum).

Smaller mammals include the arctic fox (Alopex lagopus innuitus), ermine (Mustela erminea arctica), mink (Mustela vison ingens), wolverine (Gulo luscus luscus), otter (Lutra canadensis yukonensis), lynx (Lynx canadensis

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[1]The scientific names of mammals were taken from Bee and Hall (1956).

canadensis), arctic hare (Lepus othus othus), snowshoe hare (Lepus americanus macfarlani), muskrat (Ondatra zibethicus), beaver (Castor canadensis), brown lemming (Lemmus trimucronatus), voles (Microtus spp.), and species of shrews (Sorex spp.).

Animal populations in the Arctic Range, as elsewhere in the Arctic, are not dense. Seasonally, caribou migrate through the Range. Moose are found along nearly all drainages which support willow thickets. Sheep are most abundant in the higher areas of the Hulahula and Kongakut River drainages during summer months. Grizzlies are fairly common throughout the Range.

Sea mammals which inhabit the adjacent Arctic Ocean include: the white whale (Delphinapterus leucus), ringed seal (Phoca hispida), walrus (Odobenus rosmarus divergens), and bearded seal (Erignathus barbatus nauticus).

Numerous species of birds including a large number of nesting waterfowl are found in the Range. Kessel and Schaller (1960) and Kessel and Cade (1958) have recorded some 90 species of birds on the north and south arctic slopes. Among the more commonly occurring species recorded by these studies were the willow ptarmigan (Lagopus lagopus), least sandpiper (Erolia minutilla), water pipit (Anthus spinoletta), tree sparrow (Spizella arborea orchracea), white-crowned sparrow (Zonotrichia leucophrys gambelii), pintail (Anas acuta), and the arctic loon (Gavia arctica).

Grayling (Thymallus signifer Richardson) are commonly found in the larger tributary streams and rivers, especially on the south slope. Arctic char (Salvelinus arcturus Günther) and lake trout (Christivomer namaycush Walbaum) are found in the deeper lakes.

## FEASIBLE RECREATIONAL POSSIBILITIES WITHIN THE RANGE

The most feasible recreational activities of the Arctic National Wildlife Range are discussed below. This discussion is based primarily on personal field experience.

### Back-Packing

Practically all activity in the Range will involve back-packing. However the primary consideration in this report is directed toward the individual whose end is to enjoy the aesthetic and educational values of the back-pack trip itself, rather than to the individual who views the back-pack trip merely as a means to the ultimate end, which could be that of reaching a particular fishing area. In either case many of the details discussed in this section can be applied to back-packing as an end, or to back-packing as a means.

Lake Peters offers convenient accessibility to the heartland of the Range, consequently it would serve as an appropriate depot for hiking enthusiasts. Numerous natural features in the area further enhance the area's scenic and educational values. The glaciers of Mount Chamberlin contrast sharply with the tundra of the north slope, and both are within a day's hike of Lake Peters. Lake Peters itself, along with its companion, Lake Schrader, is highly picturesque and adds considerably to the recreational value of the area.

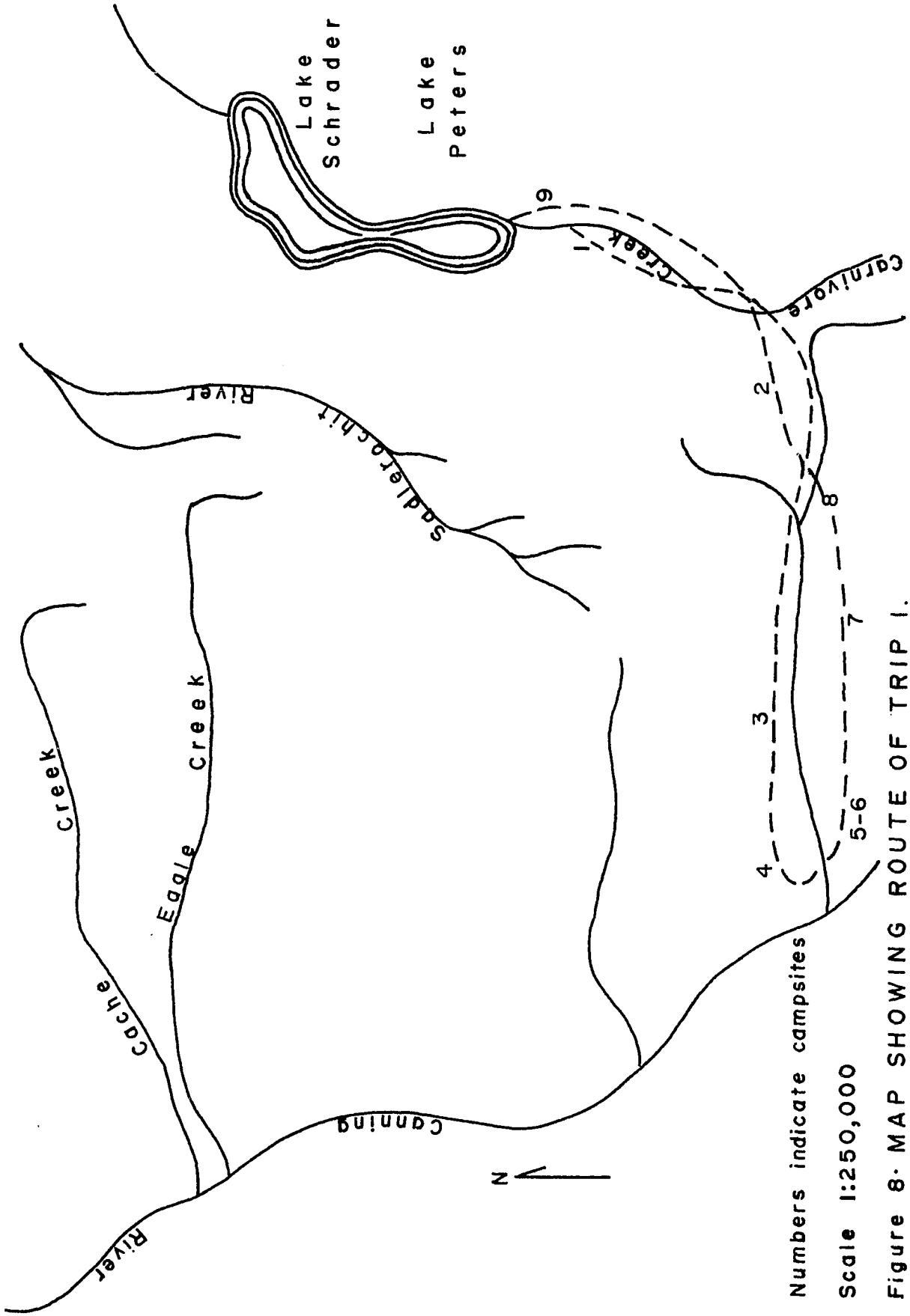
From Lake Peters a variety of back-pack routes are practical. These include a loop trip to the Canning River over four or five alternate routes. The hiker's selection from these alternates would be dependent on his interests and available time. Lake Peters is an appropriately located intermediate

point between trips originating either on the Arctic Coast or on a suitable lake on the south slope.

The summer field work of 1962 consisted of two back-pack trips, each originating at Lake Peters. Frank B. Day, Graduate Assistant, Cooperative Wildlife Research Unit, University of Alaska, and I composed the party making the first ten-day trip, Trip 1. The route of this trip (See Fig. 8) led from Lake Peters south along Carnivore Creek for approximately eight miles. The route then proceeded in a southwest direction to the Canning River along the north side of an un-named, but sizeable tributary. The party then traveled to an area about four miles north along the Canning River. At this point the trek returned to the tributary where the party crossed to the south side enroute to Lake Peters.

Three persons, David R. Klein, Leader, Cooperative Wildlife Research Unit, University of Alaska, Gary Kenwood, photographer, and I made the second trip, Trip 2. This route (See Fig. 9) led from the north end of Lake Schrader east across the northern foothills of the Brooks Range to the Hulahula River. The Hulahula was crossed at East Patuk Creek. The party followed along the east side of the Hulahula to Itkillik Creek where another crossing of the Hulahula was necessary. The west tributary of Itkillik Creek was followed south and east through the Brooks Range north-south divide to the headwaters of the Chandalar River. The route then led east to an east-west divide where a tributary of the Sheenjek River was followed to the main stream and ultimately to Lobo Lake.

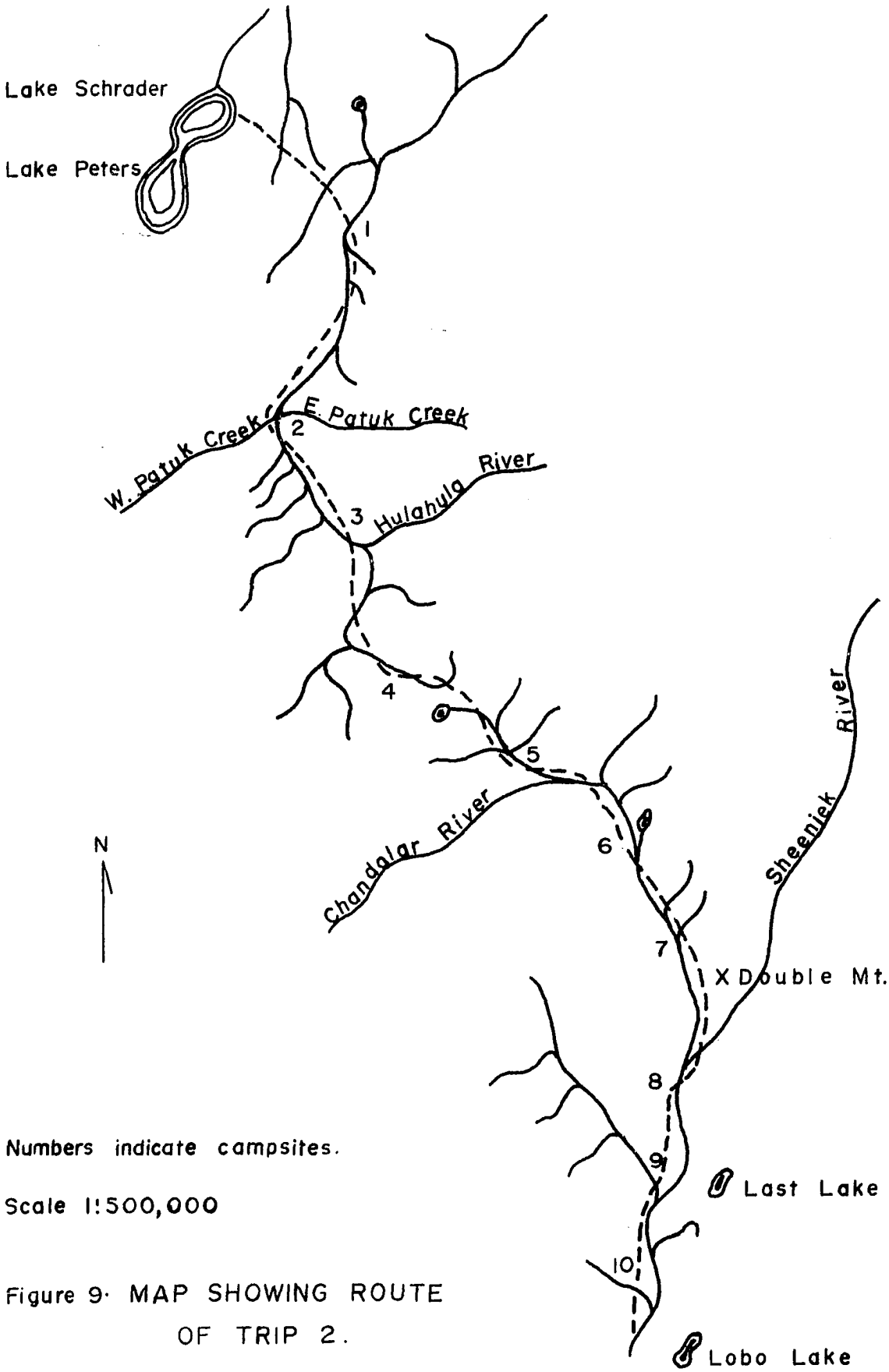
Rate of Travel. - - The rate of travel is greatly dependent upon the experience and physical condition of the hiker. Statistics from the two trips follow:




Numbers indicate campsites

Scale 1:250,000

Figure 8. MAP SHOWING ROUTE OF TRIP I.




Numbers indicate campsites.

Scale 1:500,000

Figure 9. MAP SHOWING ROUTE OF TRIP 2.

| | Trip 1 | Trip 2 |
|---|---|---|
| Total hiking time | 44 hours | 71 hours |
| Total distance | 60 miles | 110 miles |
| Miles per hour | 1.36 | 1.55 |
| Hours hiked per hiking day | 5.5 | 6.5 |
| Miles hiked per hiking day | 7.5 | 9.7 |

As seen from the data, the Trip 1 party covered 2.2 miles per day less than the Trip 2 party. Day and I represented inexperienced Alaskan hikers, neither of us having mentionable previous experience in Alaska. Additionally, we had not participated in any physically taxing activities for a number of months before the trip. Klein and Kenwood can be classified as experienced Alaskan field men. Though I did manage to follow the pace of Trip 2, I had little part in setting it. The difference of 2.2 miles per day is indicative of even greater differences which will undoubtedly result when other groups of varying experience and background hike in the Range. These trips would suggest eight miles per hiking day as an expected average for most parties who will use the area. It is pointed out that both of these trips included days in which no travel was accomplished. If these days were included, of course, the total trip average would have been reduced.

Also during the summer of 1962, Dr. Rune Lindgren (Fairbanks Daily News-Miner, Aug. 24, 1962) completed a pack trip from Demarcation Bay to Arctic Village, a distance of some 300 miles. This energetic undertaking obviously indicates that Dr. Lindgren was an experienced hiker. He hiked for 27 days, an average of 11.1 miles per hiking day. The total time of the trip was 30 days.

Equipment. - - It is imperative that much thought and consideration be given to the outfitting for a back-pack trip in this isolated area.

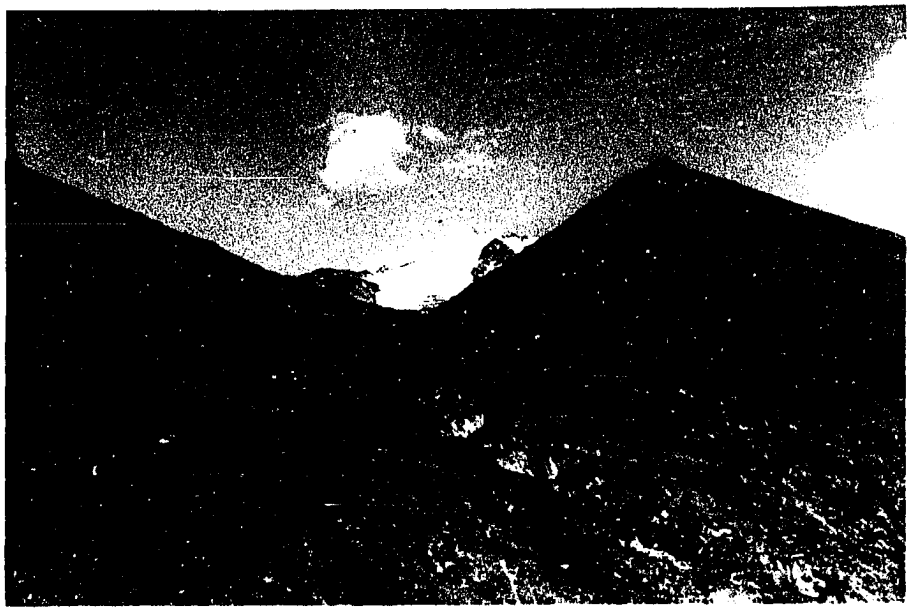


Figure 10. Rough terrain which requires durable footgear of any hiker.

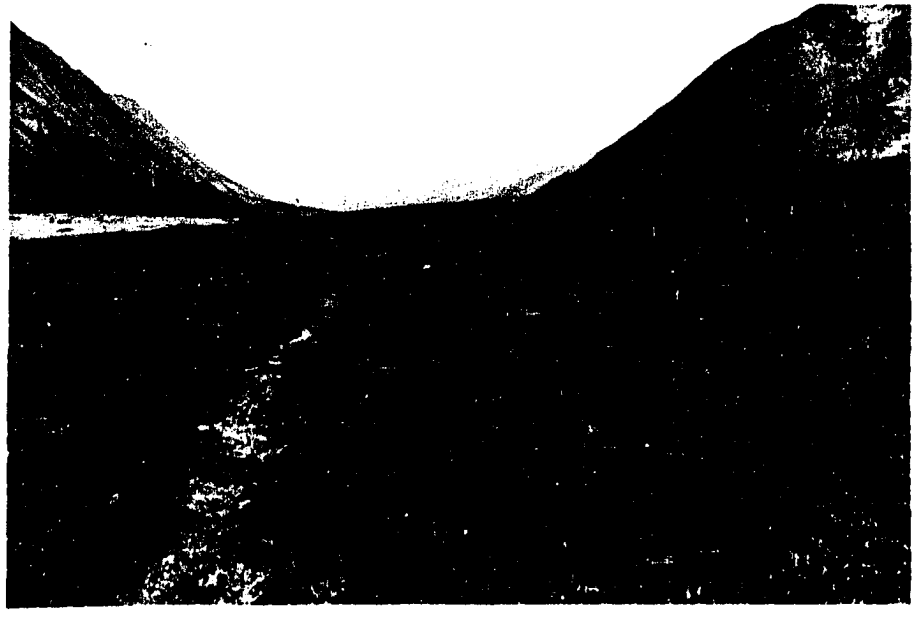


Figure 11. A caribou trail which serves very adequately as a hiking trail.

A worn out sleeping bag, ill-fitting footgear, or insufficient clothing can subtract needlessly from an otherwise pleasant trip.

Good quality footgear of the correct size is an essential item (Fig. 10). However the specific preference as to type of footgear can be left to the individual. Klein made the trip in a new pair of lightweight rubber-bottomed shoepacks and Kenwood wore a top quality pair of ten-inch conventional leather boots with rubber lug soles. Both pairs held up well though Kenwood did have wet feet occasionally. I completed the first trip with a pair of previously worn military boots. These boots were completely unserviceable after the first day of the second trip, and I was forced to use a reserve pair of boots, which fortunately were available.

A tent is a requisite, primarily because of the night-time protection it gives from mosquitoes, and of course it offers protection from rain showers. The tent used was a "family size", eight-foot diameter pyramid type, which folded into a convenient package. Including the center pole and pegs, it weighed approximately four pounds.

Klein and Kenwood carried the Kelty pack which is a superior pack for this type of trip. The frame of this pack is aluminum and is of sufficient length to keep much of the weight on top of the hiker's shoulders rather than on his back. I carried a pack board with an attached canvas bag. Day carried a pack basket which served quite well, but was not comparable to the Kelty.

Other necessary equipment includes a cook kit and rifle. On both trips a primus stove was carried but used only occasionally. A back-

packer who has a thorough knowledge of the wood supply along his hiking route could forego carrying the stove, though as the Range receives greater use the rate of consumption of wood may exceed replenishment of supply. Photographic equipment, fishing tackle, and other personal items, while not essential, add to the pleasure of the trip and the weight of the pack.

Food and Supplies. - - Following is a food list for each of the two trips:

Trip 1

Ten Day's Supply Plus Two Day's Reserve For Two People
(Approximately 60 miles)

| Item | Weight lb | Weight oz | Item | Weight lb | Weight oz |
|---|---|---|---|---|---|
| Wheat Hearts | 1 | | Dried Soups | 1 | |
| Oatmeal | 1 | | Dried Salmon | 1 | 8 |
| Wheat Germ | | 8 | Dried Beef | | 15 |
| Dry Milk | 1 | 8 | Dried Vegetables | | 8 |
| Brown Sugar | 1 | | Macaroni | 1 | |
| White Sugar | 1 | 8 | Brown Rice | 1 | |
| Dried Eggs | 1 | | Noodles | 1 | |
| Bacon | 4 | | Ham | 1 | |
| Logan Bread (concentrated fruit-nut bread) | 4 | | Dried Beef Stew | | 8 |
| | | | Margarine | 1 | |
| Chocolate | 2 | 8 | Instant Orange Juice | | 8 |
| Raisins | 1 | | Instant Coffee | 1 | |
| Prunes | 1 | | Tea | | 8 |
| Apricots | 1 | | Salt | | 4 |
| Dates | 1 | | Pepper | | 4 |
| Dried Apples | | 10 | Cheese | 1 | 4 |
| Metrecal (a milk product food supplement) | 1 | | | | |
| Summer Sausage | 1 | | | | |

Total Weight: 37 lbs 13 ozs
Wt/Man-day 1.6 lbs
Total Cost at Fairbanks: Approximately $40

Trip 2

Sixteen Day's Supply For Three People
(Approximately 110 Miles)

| Item | Weight lb | Weight oz | Item | Weight lb | Weight oz |
|---|---|---|---|---|---|
| Wheat Hearts | 1 | 8 | Dried Soups | 1 | 4 |
| Oatmeal | 3 | | Dried Salmon | 2 | 8 |
| Wheat Germ | | 12 | Dried Beef | 1 | 4 |
| Dried Milk | 2 | 8 | Dried Vegetables | 1 | |
| Brown Sugar | 1 | | Dried Potatoes | 1 | 8 |
| White Sugar | 3 | | Macaroni | 1 | |
| Dried Eggs | 1 | | Brown Rice | 1 | 8 |
| Bacon | 5 | | Noodles | 1 | 8 |
| Logan Bread (concentrated fruit-nut bread) | 10 | | Ham | 1 | |
| Chocolate | 4 | | Dried Beef Stew | 1 | |
| Raisins | 3 | | Margarine | 1 | |
| Prunes | 1 | | Instant Orange Juice | | 12 |
| Apricots | 1 | | Instant Coffee | | 4 |
| Dates | 1 | | Tea | | 8 |
| Dried Apples | 1 | | Salt | 1 | |
| Metrecal (a milk product food supplement) | 3 | | Bisquick | 1 | 4 |
| Summer Sausage | 1 | | Cheese | 2 | 8 |
| Meat Bars | 2 | | Jello | 1 | 8 |

Total Weight: 67 lbs 0 ozs
Wt/Man-day 1.4 lbs
Total Cost at Fairbanks: Approximately $75-80

The kinds and types of food used on the two trips were found to be satisfactory. During Trip 1 the food supply for the ten-day trip was adequate, as a two-day reserve was carried. However on the second trip it was necessary to limit our food consumption because of an insufficient amount of food, even though some fresh fish were eaten. These trips indicate that a person can hike on approximately one and a half pounds of dried food per day. Each food article was carried in an individual plastic bag.

Weight of the Packs. - - Day's pack weighed 60 pounds at the beginning

of the first trip. The pack I carried weighed 65 pounds. Of course, the weight soon diminishes as the food is eaten. On the second trip the beginning weight of each of the three packs was near 70 pounds. My personal feeling is that every effort should be taken to keep the weight of the pack in the 50-pound category. This indicates the desirability of shorter trips originating from a base camp.

Terrain Conditions. - - In general the terrain conditions of both Trip 1 and Trip 2 routes served for good hiking. Very favorable conditions existed at the head of the Sheenjek and Chandalar Rivers and along the east side of the Hulahula River (Fig. 11). Caribou trails were much less distinct on much of the Lake Peters loop trip. The route of Trip 1 led over more boggy areas than did Trip 2. The vegetation on the north side of the Canning River tributary was of sufficient height and density to offer mild resistance to the hiker. The south bank of this stream had fewer shrubs but more bogs.

The poorest footing of both trips was experienced along the east side of a north flowing tributary of Itkillik Creek. This adverse condition resulted from rain showers on an unvegetated surface which then became very slippery. In the Sheenjek Valley the many muskegs were generally avoided by staying high along the edge of the west bank of mountains. Coarse talus slopes which had to be crossed were well scattered throughout the route of both trips. Care is required of the hiker in traveling over these areas as the footing is poor, and carelessness could lead to a twisted ankle or a fall. These areas demand exceptionally good quality in footgear.

Caution is essential in crossing streams. On Trip 1, Day and I made

an intensive search before finding a suitable place to cross the west portion of the Canning River tributary. Careless consideration of a crossing point could easily lead to an untimely dunking. The waters of the Canning River tributary and Carnivore Creek were relatively deep (4-6 feet), cold (40° - 45°F.), and extremely swift.

The Hulahula River was crossed with no problem on two occasions (Fig. 12). An air mattress made possible the successful crossing of the Sheenjek River, estimated to be 120 feet wide at the point of crossing (Fig. 13). The procedure used provided that each member of the party swim the river with the aid of the air mattress, which carried the gear of the respective swimmer. Just past the mid-point of the river, the water was shallow enough to allow the swimmer to stop, unrope his gear and then proceed to walk across. As only one air mattress was available, a fish line was attached to the mattress during the first two crossings. This allowed the mattress to be retrieved for the successive crossing. It is recommended that the hiker carry a light, but strong, line to assist in the crossing of major drainages throughout the Range.

Mountain Climbing

Though the numerous mountains of the Arctic Wildlife Range will not draw the hard rock climbers from throughout the world, mountain climbing can be fostered here. Mount Michelson and Mount Chamberlin are the highest peaks, 9,239 feet and 9,131 feet respectively, but they are not technically challenging to the experienced climber. A two-man party made what is believed to be the first ascent of Mount Michelson in April, 1957 (Thomson, 1957). The trip, although rigorous, required no special

Figure 12. Crossing the cold, swift, Hulahula River with approximately 70 pounds of camp gear.

Figure 13. Emerging from a frigid swim across the Sheenjek River.

equipment and crampons were not even used, but the climbers were in agreement when explaining that the 550.00 dollars expended for this experience were well worth while. It becomes clear from such accounts that even the ascent of the smaller mountains by inexperienced climbers is similar to the conquering of Mount McKinley by more adept climbers. Many of the nation's recreational areas have rugged mountains which the average recreationist would not think of climbing. Thus, such areas have little value in teaching the rewarding experiences which come from rising slowly above an ever enlarging landscape. The Brooks Range mountains are on the whole not difficult to climb, but partly because of their remoteness, they have the subtle capacity to tempt the Arctic Range visitor and thus ultimately lead to an increased interest in mountain climbing.

Canoeing

The use of small water craft in the Arctic Range offers a definite recreational potential. Though little canoeing has been accomplished in the Range the area does offer an excellent environment for the experienced canoeist.

The streams of the Arctic Wildlife Range head in the Brooks Range and flow both to the north and south.

For 25 miles on either side of the divide the streams are swift and fall rapidly to the lowlands.

Following is a description of a trip down the Kongakut (Collins, 1953):

> The Kongakut is a rough, wild river in a gorge something like that of the Fraser River, though on a smaller scale. But the scale is big enough when you are the first people ever to take boats down it (folding boats brought by plane to the headwaters).

> The cascades and rapids, and the big boulders, have made us battle to save the boats, and ourselves too, for days. We tried riding in the boats at first, but couldn't manage them in the whirlpools and cascades, so we had to let them down through such places with ropes, working in the rushing white water up to our hip pockets. If you get any deeper you get carried away. In fact, it is very hard to stand up in this water if it comes above one's knees. I don't know how many times we have been knocked down by the current or dragged through the boulders and water by the boats, but on our toughest day we were in the water from 8:30 a.m. 'til 10:30 p.m.--too busy and too tired to slap at the mosquitos.
>
> We have only sunk a boat once, when a boulder ripped its side, we saved everything and mended the boat. Now we are past the narrows and although it still takes some fancy work to make all the sharp bends in the river, by comparison its like 'Cruising down the River on a Sunday Afternoon.'

This description can with some reservation be applied to other streams which head in the Brooks Range.

The primary problem is finding means of transporting the canoe or foldboat to a launching site. It is conceivable that a party could work upstream into the Arctic Range from the Yukon Flats. A more likely possibility would be to transport a foldboat by plane to a lake or river bar.

One of the most feasible stream routes from the Range would lead from the upper Sheenjek Valley, accessible by float plane, southward to a pick-up point on the Porcupine River or even to Fort Yukon. Depending on stream conditions a party can travel 15-30 miles per day.

Hunting

Today the well-to-do sportsmen are going farther and farther afield for an experience in big game hunting. Alaska's Brooks Range is within 12 hours of most of the nation's major cities.

However few hunters will come to the Arctic Range for the express purpose of hunting, rather they must also come to enjoy the uniqueness and remoteness of the Range itself. An Alaskan game guide (F. Griffin, viva voce)

in corresponding with a Wisconsin man about an Arctic Range hunt, said, "I won't book a hunt unless it is a combination hunt." Griffin means that his client should not hunt in the Range with the single idea of a trophy animal or a record kill, but rather the hunter must also be able to appreciate and enjoy the arctic environment.

The Dall sheep, grizzly bear, caribou, and moose are the species most attractive to the hunter, though in recent years the wolf has also attracted interest from the trophy hunter. During early June, 1961, and July, 1962, a large number of sheep was observed along the Hulahula drainage. Grizzlies are found primarily in the foothills both north and south of the Brooks Range. Six grizzlies were seen while making Trip 2 in 1962: five of these were viewed in the Sheenjek River Valley.

Caribou migrate through the Arctic Range in large numbers. They can usually be found throughout the Range during the summer although numbers and distribution of these migratory animals are not always predictable. Moose occur in the willow borders along the rivers throughout the Range, but are more common along the south slope drainages. Ptarmigan are found on both the north and south slopes.

Fishing

Fishing activity in the Arctic Range will be primarily limited to the grayling found in the streams of both slopes. While completing Trip 2, Klein on two occasions, caught a dozen fish within a half hour. These fish generally ranged between 8-12 inches in length, the largest measuring 16 inches. The tributary streams seem to offer better fishing than the main streams, which often are turbid with large amounts of suspended material.

Lake Peters and Lake Schrader contain lake trout, but it is doubtful that these arctic lakes can support any sustained fishing pressure. Arctic char are found in the lakes and many of the streams on the north slope.

Photography

The Arctic Wildlife Range provides an excellent opportunity for the photographer interested in landscapes and nature scenes.

The expanse of treeless tundra, the bleak, barren mountain tops typical of the Brooks Range, the mountain glaciers, and the Arctic Ocean coast line furnish exceptional subjects for the landscape photographer.

The wildlife as well as many summer wild flowers also add to the photogenic character of the area.

Preferences as Indicated by Questionnaire

As part of this overall study a short questionnaire (Appendix C) was prepared and sent to members of four organizations known for their support of aesthetic and recreational values of the out-of-doors. The following discussion will be confined to an analysis of answers given to question ten, which asked that the three most attractive recreational activities feasible in the Arctic Range be listed in order of decreasing importance according to individual preferences.

The organizations represented are: the Sierra Club, San Francisco, California; the Adirondack Mountain Club, Gabriels, New York; the Green Mountain Club, Rutland, Vermont; and the National Campers and Hikers Association, Buffalo, New York. Admittedly these groups do not represent a cross section of public opinion, but such an assemblage can speak knowledgeably about the wilderness and recreational values of an area like the Arctic Range.

The answers from question ten are not intended for statistical analyses, rather they merely indicate the preferences of a group already agreed that aesthetic and recreational values of the Arctic Range are of paramount importance.

From late October, 1962, through early December, 1962, 720 questionnaires were sent to members of the above mentioned organizations. Forty one per cent (298) of these questionnaires were returned by April 30, 1963. Of the questionnaires returned, 199 indicated that the respondent was interested in making a trip to the Arctic Range. It was this group which was then requested to select in order of decreasing importance the three most attractive recreational activities of the Arctic Range. The following tally resulted:

| Activity | Total Mention | First Preference | Second Preference | Third Preference |
|---|---|---|---|---|
| Back-packing | 169 | 104 | 52 | 13 |
| Photography | 148 | 33 | 60 | 49 |
| Mt. climbing | 93 | 35 | 23 | 35 |
| Canoeing | 81 | 14 | 29 | 38 |
| Fishing | 73 | 17 | 25 | 31 |
| Science | 51 | 15 | 16 | 20 |
| Hunting | 16 | 5 | 8 | 3 |

It is evident that nearly all of these activities are complementary making quite difficult the selection of the most attractive recreational activity. No one would go to the Arctic Range without a camera, and certainly back-packing would be involved in most any adventure; however, such a listing of preferences is of value when considering a future management plan for the area.

From the population questioned, back-packing was found to be the most popular activity. Photography and mountain climbing were second and third,

respectively, in terms of total mention received. These activities were followed in preference by canoeing, fishing, science, and hunting. Science categorizes those people with a definite scientific interest in some aspect of the Range. These interests closely parallel recreational interests, though technically they are distinguishable. It is interesting to note the small interest hunting draws from the particular population questioned.

The most "pure" of these groups in matters of conservation philosophy is the Sierra Club. The Mountain Clubs are intermediate in their views, while the National Campers and Hikers Association is recognized as representing a more liberal point of view. Some of the basic tenets of each organization are revealed by examining Figure 14 which shows the support given to the various recreational activities by the respective organizations. The Green Mountain Club was not included because of insufficient response to the questionnaire.

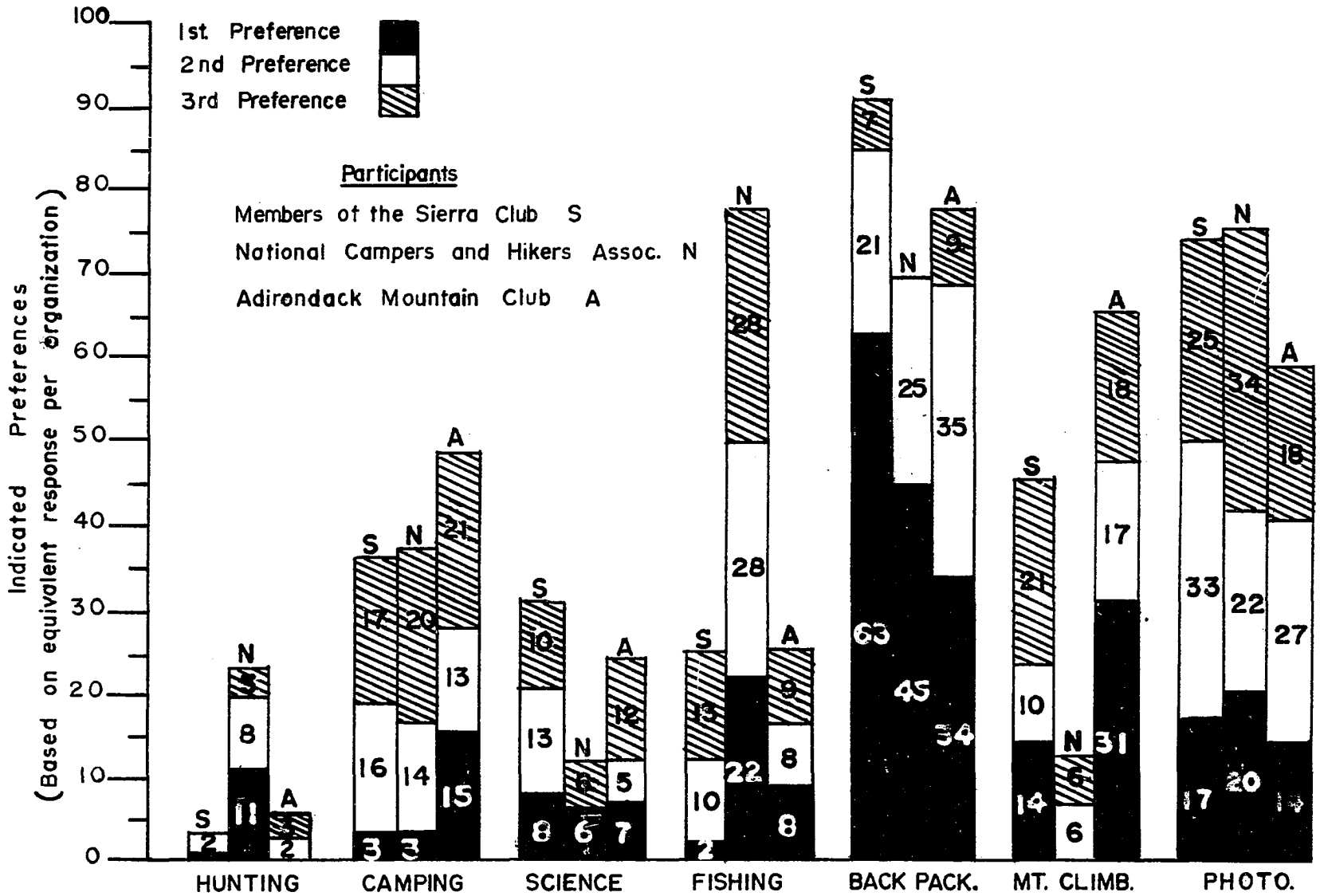



Figure 14· PREFERENCES RATING OF RECREATIONAL ACTIVITIES

## FACTORS AFFECTING THE UTILITY OF THE RECREATIONAL RESOURCE

### General Increase in All Outdoor Recreation

Within recent years, outdoor recreation has, in an unprecedented way, dominated the scene in the field of renewable resource management. It is nearly impossible to find a current technical or professional magazine or journal that does not give some type of coverage to outdoor recreation. Even the popular press has printed numerous articles relating to the general problems evolving in this field. All of this interest stems from an ever-expanding demand for outdoor recreation, a resource wholly dependent on the non-renewable resource, land. The Federal government, recognizing the need for additional study and research, created in June, 1958, the Outdoor Recreation Resources Review Commission (Public Law 85-470,72 Stat. 238). It was from the recommendation of this Commission that the Bureau of Outdoor Recreation was created in 1962 and the Land and Water Conservation Fund was established in 1964. Likewise, other federal and state agencies have accented the role of outdoor recreational development.

Recreational use of outdoor areas has been increasing at the rate of 10 to 12 per cent per year (Beazley, 1961). According to a recent study (ORRRC Report 20, 1962), 90 per cent of all American adults annually engage in one or more outdoor recreational activities.

Four major factors, all demonstrating upward trends, compose the variates which relate to the increasing use of recreational areas.

Population. - - The United States population is growing at the rate of 1.7 per cent per year (U. S. Department of Commerce, 1960). Experts are

predicting that by the year 2000 the United States population will be 330 million people (Landsberg, Fischman and Fisher, 1963).

Income. - - Per capita disposable income is expected to rise 114 per cent between 1960 and 2000 (ORRRC, Report 26, 1962). Admittedly all this increase is not in real income, still the resultant effects on outdoor recreational activity by the American public will be pronounced.

Leisure. - - The increased amount of leisure time has led to more outdoor recreational participation by the American people. A study (ORRRC, Report 26, op. cit.) shows that from the results of a personal interview, "insufficient time" was given as the most important factor limiting participation in outdoor recreation. The average work week is expected to decrease from 38.5 hours per week in 1960 to 30.7 hours per week in 2000; therefore, each individual's potential for enjoying outdoor experiences will be expanded.

Mobility. - - Constant improvement in transportation will allow people to travel more. The average traveler in the year 2000 will cover approximately twice the distance of the average traveler in 1960 (Landsberg, et al., 1963).

Clawson (1959) has categorized recreational land areas into three groups, 1) the user-oriented, 2) the intermediate, and 3) the resource-based. The user-oriented area has as its most important characteristic, accessibility. These areas are not required to possess any original beauty or unusual natural qualities. Examples include golf courses, swimming pools, and city parks. The intermediate areas are those within a two-hour driving distance from a population center. These areas may possess scenic attractions but this is not the all-important consideration. The primary aim of

such areas is to provide the best available facilities without sacrificing accessibility. State parks fit into this category. Resource-based areas possess significant natural qualities making them outstanding attractions. A proximate location to the user matters little. The national parks are classified as resource-based areas. The Arctic National Wildlife Range is an example of a resource-based area. Its resources are most unique, and it poses very restrictive limitations regarding accessibility.

Clawson (op. cit.) predicts that the demand for user-oriented areas will increase four times between 1950 and 2000. During this same period, the demand for intermediate areas will increase 16 times, and the demand for resource-based areas will increase 40 times.

Technically, all wilderness recreation is confined to the resource-based areas. And as stated above this general type of recreation is experiencing tremendous growth. Projection to the year 2000 indicates that the use of wilderness areas will increase ten times above the 1959 level (ORRRC Report 3, 1962). Federal lands capable of providing wilderness recreation are becoming scarcer each year because of the effect of competing uses on the irreversible character of wilderness areas. Certainly the Arctic Range provides important elements that must be considered in the comprehensive planning of future Federal land management programs.

Remoteness and Uniqueness of the Arctic Range

The primary attraction of the Arctic Range is its capacity to offer a remote and untamed area. Such areas in northern Alaska supply an important segment of the last undisturbed landscapes remaining in the United States. The large size of the Arctic Range provides a wilderness character unequaled

in any other established area in this country. The only reasonable, rapid means of accessibility to the Range is by plane to a lake, river, river bar, or coastal area. From these points an individual can in a very short time find solitude with nature and abandon the stress of twentieth century living. Those who use this area must be prepared to navigate in a country where a map is the only guide and where caribou have served as the only trail crew. The unclimbed mountains and secluded creeks are innumerable.

All the recreational values are enhanced by the remote location of the Range. Greater numbers of wildlife and more spectacular scenic attractions can be viewed in other national recreational areas, but the element of complete remoteness, as experienced in the Arctic Range, provides an entirely different stage for the performance of these features.

Physical Stamina of the User

An important limiting factor controlling the use of the Range will be the physical stamina and condition of the user. Certainly no special talent or ability is required for a hiking adventure, but experience is beneficial, and good physical condition is a necessity. It must be assumed that anyone who visits the Range will be doing a certain amount of hiking, whether it be from a base camp, or of the cross-country type. Hiking conditions may at times be adverse where muskeg, hummocks, and talus slopes prevail. Swift, cold streams must be waded in some cases. Intermittent light rains are common.

The user must also be resigned to living with the mosquitoes. During the field trips of 1962 there were times when literally clouds of mosquitoes were present, though their attacks could be curtailed by the use of repellent.

The psychological effects of the mosquitoes are more damaging than the physical effects. Hiking at times can be almost unbearable until one accustomes himself to the fact that he will swallow an occasional mosquito, that his nostrils will function as a Venus fly-trap, and that he cannot escape from the noisy pests. When these facts are accepted, living in the Arctic Range with the mosquitoes is no great problem.

Costs

The relatively high costs of recreating in this remote area will eliminate its use for many people. The following discussion relies heavily on the cost data collected during the 1962 field season.

Transportation. - - The primary expenditure associated with visiting the Arctic Range is the cost of transportation. The Cessna 180, an aircraft with capacity for two passengers and gear, can be chartered for 50.00 dollars per hour in the Fairbanks area. This plane requires six hours for the round trip, Fairbanks-Lake Peters-Fairbanks. Assuming a party arranges a visit to the Range for an extended period, two round trips are necessary. This results in a total cost of 600.00 dollars (Trip 1).

The larger Cessna 185, capable of carrying three passengers and gear, can make the two round trips in ten and a half hours. This aircraft rents for 60.00 dollars per hour. The total cost amounts to 630.00 dollars (Trip 2). A reduction of approximately one-third of these costs would be possible if a commercial flight were taken from Fairbanks to Fort Yukon where a charter flight could then be engaged. The costs of charter flights from either Fairbanks or Fort Yukon can be halved when sufficient use of the Range eliminates the empty returning flights. The cost would be even less

for the individual who flew his own aircraft.

Equipment. - - It is valid to assume that the people attracted to the Arctic Range would have little need to make further capital outlays for camping equipment. However for purposes of a cost record, an estimated rent or depreciation value is given for the major items:

| Trip 1 (Two-men, ten-days) | | Trip 2 (Three-men, sixteen-days) | |
|---|---|---|---|
| Back-packs | $ 1.00 | Back-packs | $ 2.00 |
| Cameras | 8.00 | Cameras (one movie camera) | 25.00 |
| .44 Magnum pistol | 3.00 | Rifle | 3.00 |
| Sleeping bags | 3.00 | Sleeping bags | 6.00 |
| Tent | 2.00 | Tent | 4.00 |
| Primus stove and cook kit | 1.00 | Primus stove and cook kit | 2.00 |
| TOTAL | $18.00 | TOTAL | $42.00 |

Food and Supplies. - - Though food is listed among the costs of the two trips, it should not be regarded as a true cost. Rather it should be viewed as merely a substitute for such cost incurred during routine living. The food costs of Trip 1 were approximately 40.00 dollars while the food costs of Trip 2 were 80.00 dollars.

Film and film processing were the major supply expenses. The total supply expense is broken down as follows:

| Trip 1 | Cost of Film and Processing |
|---|---|
| Two rolls - Pan x (black and white) | $ 6.70 |
| Additional prints (black and white) | 6.00 |
| Four Kodachrome film (36 exp. ea.) | 24.40 |
| 300 feet Kodachrome movie | 36.00 |
| TOTAL | $73.10 |

Various small supply items including plastic bags, fish line, and ammunition amounted to an approximate 12.00 dollars.

| Trip 2 | Cost of Film and Processing |
|---|---|
| Three rolls (black and white) | $ 9.75 |
| Additional prints (black and white) | 4.20 |
| Kodachrome | 15.00 |
| 1700 feet Kodachrome movie | 204.00 |
| TOTAL | $232.95 |

Various small items similar to those used on Trip 1 cost about 25.00 dollars.

Total Costs. - - The approximate total costs for the two trips follows:

Trip 1 (two-men, ten-days)

| | | |
|---|---|---|
| Transportation (based on current commercial Cessna 180 rate) | | $600.00 |
| Equipment (rent value) | | 18.00 |
| Food | | 40.00 |
| Supplies | film and processing | 73.10 |
| | miscellaneous supplies | 12.00 |
| | Total Cost (Trip 1) | $743.10 |

Trip 2 (three-men, sixteen-days)

| | | |
|---|---|---|
| Transportation (based on current commercial Cessna 185 rate) | | $630.00 |
| Equipment | | 44.00 |
| Food | | 80.00 |
| Supplies | film and processing | 232.95 |
| | miscellaneous supplies | 25.00 |
| | Total Cost (Trip 2) | $1011.95 |

The actual costs of a trip to the Range will be altogether dependent on the activities and desires of the individual. Transportation costs could be considered generally a fixed cost with the other costs being more variable.

## SOME ECONOMIC ASPECTS OF THE ARCTIC WILDLIFE RANGE

The nine-million acre Arctic Wildlife Range as a specific area with distinct boundaries will tend to concentrate increased national attention on the recreational resources of Alaska. Developing the economy of Alaska has been and continues to be of great concern throughout not only Alaska, but the nation. The mining and fishing industries have taken their turns in promising Alaska a great economic future yet to materialize. The smaller fur industry has experienced recent declines. Government defense spending has been the primary force which has allowed Alaska to maintain its improved economy of the last two decades. Rogers (1962) notes that Alaska's past economic development has taken place in a highly selective and specialized manner because of lack of local markets and remoteness from large consuming markets elsewhere. Alaska's natural resources, unusually abundant or valuable because of no competitive alternative supply, have in the past been subjected to ruthless exploitations.

However with the recent impact of public demand for recreational and wilderness areas, and with Alaska being abundantly supplied with the resources for meeting this demand, it now appears that a segment of Alaska's future self-sustaining economy can be based on the marketing of recreational resources as non-consumptive goods. The following is from Outdoor Recreation for America (ORRRC, 1962):

> Alaska is a storehouse of recreation opportunities. In this new state, with far less than 1 percent of the total national population, are 31 percent of the lands in the National Park System, 65 percent of the wildlife refuge lands, 64 percent of the public domain, and 11 percent of the national forest acreage. This generous supply gives some indication of the role Alaska could play in meeting the recreation demands of the people of the other 49 States.....There are

> difficult problems to be solved before this great potential can be realized. Alaska is still remote for most Americans seeking outdoor recreation; it takes time and money to get there. The prospect is that over the next 40 years the public will have more of both and thus visit Alaska more. Advances in travel technology will also help.

The operations of Northern Consolidated Airlines near Katmai and of Camp Denali near Mount McKinley are early examples of private enterprises entering the Alaska outdoor recreational scene. The establishment of the Arctic Wildlife Range represents an initial governmental effort to establish something which approximates a "pure" wilderness area in Alaska. Though many of Alaska's future visitors will not participate directly in wilderness recreation, the wilderness character will pervade the State and add a certain intangible, but attractive, quality detectable by all who come to Alaska. An Alaskan editorial (Fairbanks Daily News-Miner, June 10, 1961) contained the following:

> We have been smugly content to say with utter conviction that Alaska has a tremendous future and point with pride to the.... resource opportunities as adequate proof of destiny. But nobody has been willing, or able to spell out what we are talking about in this great future. Build roads, and dams, and factories, and the wilderness disappears.
>
> We live in Alaska because it is beautiful and we like it here. Will we like it if we share it with millions, and super roads criss-cross the land? Will new settlers and tourists wish to come to Alaska to see farms, and factories, and modern communities?
>
> We must accept that the great Alaskan wilderness itself is our dominant resource.

The following testimony was given at the Bartlett Hearings (Wood, 1960):

> What brings the flood of tourists to Alaska is not our deluxe accommodations, commercialized amusements, or even just our scenery, which is equaled in some respects in the Pacific Northwest, the Alps, or Norway. It is the psychological lift the visitor gets whether or not he gets far from his car, train, or boat, knowing that beyond that ridge, across that valley, behind that mountain peak, there are no roads, powerlines, or people, just moose, caribou, bear, and virgin country.

If the great Alaskan wilderness itself is Alaska's dominant resource what exact role can it play in developing the State's economy? Gramm (1964) points out that Alaska can hardly afford to sit and wait for wilderness seeking tourists from the south to come and spend money. Gramm writes:

> What greater and eventually debilitating dependency can be imagined for a society than to depend for its livelihood on the sale of natural resources (which it has done nothing to create) to people who have worked and saved while producing real goods. And, what greater insecurity is there than depending on the whim of the pleasure seeking vacationer.

Rogers (op. cit.) envisions somewhat of an indirect relationship between Alaska's wilderness resource and State economic development. Though Rogers recognizes that Alaska can expect certain benefits from serving a tourism and recreation industry, he indicates agreement with Gramm that this is no place to hang one's hat.

Rather, in view of the rapid nationwide expansion of industrial and residential complexes, Rogers suggests that Alaska's wilderness character can serve as an important amenity capable of attracting permanent residents distraught with pressures and congestions that accompany urban living in many of the other states. In exchange for providing an attractive environment, the State of Alaska would begin to experience a more stable and productive economy based on a more stable resident population. A problem of long standing in Alaska has been the need for truly permanent residents. Traditionally, Alaska has been known as the place to make a "quick buck". Through past years Alaska has been nothing more than a "tour of duty" to thousands of military families. However, now a reason is presented for the growth of an Alaskan population which will have a real and definite interest in the State's political and economic structure. These "true" Alaskans

would not look to their upcoming vacation period as their next opportunity to re-visit Seattle or Iowa or New York, instead they would want to explore their new homeland by visiting the Aleutians, Mount McKinley, Fort Yukon, or the many other places of interest throughout the State. Rogers writes:

> A growing number of our citizens dissatisfied with the artificiality of fin-tailed contemporary American culture could discover in Alaska a place to live and the means for creating a more satisfying way of life. This would provide the "filling process" between other specialized development which would create a more stable and broader based Alaska.....

Such an approach provides that Alaska's natural resources not be considered solely as materials upon which technology works in the production of goods, but as factors capable of influencing the major social and economic forces of a region.

The Arctic National Wildlife Range is one of the more remote recreational and wildlife areas in Alaska. Likely, only a small percentage of the Alaskan tourists or even residents will visit the Range, but as the nation's largest designated recreational and wildlife area, the Range does serve a significant role in symbolizing Alaska's wildland resources.

Indicated Direct Expenditures of Potential Arctic Range Visitors

Question seven of the earlier mentioned questionnaire (Appendix C) was used to determine the number of respondents willing to meet the required costs of visiting the Arctic Wildlife Range.

Approximately 350.00 dollars per person is required for the trip. This provides for two round trip flights from Fairbanks. With sufficient use of the Range to prevent empty returning flights, costs of the trip could be reduced to the 200.00-dollar category. So for purposes here, all

respondents indicating a desire to spend 200.00 dollars or more will be regarded as "candidates" for the trip. Of course, those spending but 200.00 dollars will obviously not be afforded the same opportunity as the enthusiastic photographer, hunter, or canoeist who can spend 400.00 dollars.

The following tabulation results from the 298 returned questionnaires:

| Number of respondents | Greatest monetary expenditure to visit the Range |
|---|---|
| 117 | not interested |
| 9 | $ 50.00 |
| 45 | 100.00 |
| 58 | 200.00 |
| 33 | 300.00 |
| 36 | 400.00 |

One hundred and twenty seven respondents (43 per cent) indicated they would spend at least 200.00 dollars to visit the Range. It is pointed out that the 298 returned questionnaires came from the more interested individuals of the 720 who were sent questionnaires. Assuming that all of the individuals not returning the questionnaire were not interested in the trip, calculations would still indicate that 18 per cent of the sample group would meet the minimum costs of the trip.

Some 65 per cent of the Sierra Club respondents indicated a willingness to spend at least 200.00 dollars. Thirty-five per cent of the Adirondack Mountain Club representation was in the "candidate" bracket, while the National Campers and Hikers Association had only 15 per cent of its respondents willing to spend the 200.00 dollars.

Following is a tabulation from the three organizations:

SIERRA CLUB (120)

| Number of respondents | Percentage | Greatest monetary expenditure to visit the Range |
|---|---|---|
| 25 | 21 | not interested |
| 1 | 1 | $ 50.00 |
| 15 | 12 | 100.00 |
| 38 | 32 | 200.00 |
| 23 | 19 | 300.00 |
| 18 | 15 | 400.00 |

ADIRONDACK MOUNTAIN CLUB (104)

| Number of respondents | Percentage | Greatest monetary expenditure to visit the Range |
|---|---|---|
| 46 | 45 | not interested |
| 3 | 3 | $ 50.00 |
| 18 | 17 | 100.00 |
| 16 | 15 | 200.00 |
| 8 | 8 | 300.00 |
| 13 | 12 | 400.00 |

NATIONAL CAMPERS AND HIKERS ASSOCIATION (66)

| Number of respondents | Percentage | Greatest monetary expenditure to visit the Range |
|---|---|---|
| 43 | 65 | not interested |
| 5 | 8 | $ 50.00 |
| 8 | 12 | 100.00 |
| 3 | 4 | 200.00 |
| 2 | 3 | 300.00 |
| 5 | 8 | 400.00 |

In addition to the mailed questionnaire, a short personal interview (Appendix D, Questions 14, 15, 16) was conducted among Fairbanks residents to determine extent of their willingness to meet the required expenditures for the arctic trip. These interviews included 197 Fairbanks households which represented a five per cent sample. The results revealed that at least one member from 24 per cent of the city's households would be willing

to meet the necessary monetary expenditures.

The results of these questionnaires can only furnish an idea of how the interested public considers the Arctic National Wildlife Range as a recreational area. Findings also indicate that some specific Alaskan communities, especially Fairbanks, can expect some direct monetary returns from use of the Arctic Range. A definite potential exists for air services to the Range. It is entirely conceivable that in the near future a four to six place plane could make daily flights during the summer months. Guide service and the sale and rental of sporting and camping equipment will also present real opportunities.

## PLANNING FOR THE RECREATIONAL USE OF THE ARCTIC RANGE

A recreational management plan for the Arctic Range must necessarily consider and provide for other land uses. Recreation is but one of a number of uses the Range is capable of accommodating.

A suitable land use plan for the Arctic Range will result only as intelligent management practices are proposed and adopted to implement the provisions of the Executive Order which established the Range (Appendix E). Because of divergent interests represented by the Range, perhaps trial-and-error methods must proceed that ultimate and balanced plan that best effects the objectives of the Executive Order.

Any land use plan should have the capacity to serve as a continuing function, and thus be effective in dealing with unforeseen, but inevitable, situations. A successful long-range plan for the Arctic Range can not be rigid but must provide flexibility. It would be a mistake indeed to devise a detailed plan governing the long-range use of the Range before mentionable use has commenced. Such planning could easily become an exercise in standing up straw men to knock them over.

The Arctic Range does not now need a plan such as the one being considered for the Boundary Water Canoe Area in Minnesota (Izaak Walton League, op. cit., 1965), and there is no need for a detailed set of stipulations controlling the operation of oil and gas wells such as was developed for the Kaibab National Forest (U. S. Forest Service, 1959). The plan for the Canoe Area and the stipulations in the Kaibab were developed in response to particular and immediate needs. Management of the Arctic Range should also be continually afforded the opportunity to respond to particular and immediate needs.

A case in point within the Arctic Range itself was the issuance of special use permits and accompanying regulations by the Bureau of Sport Fisheries and Wildlife for surface geological study in the Range during the summer of 1965 (Dean, 1965). The announcement of these regulations succeeded a statement by the Secretary of the Interior that Federal lands along the Arctic Coast would be opened to oil and gas leasing (U. S. Department of the Interior, 1965). These regulations were not the immediate and direct result of a detailed planning effort as no funds have been allocated for such planning since establishment of the Range (Ackerknecht, 1965). Admittedly there is some inherent risk in such a short range operation; however, a plan permitting response to immediate needs will in the long run encourage the most successful and effective management of the Arctic Range.

The support for flexibility in a plan as presented here is not to say that basic objectives should also be vague. On the contrary, the basic objectives that give direction to planning must be sharp and clear. Fortunately, the provisions of the Executive Order itself do provide limits within which a planning effort must operate.

## Guidelines for Planning

Bureau of Sport Fisheries and Wildlife. - - In planning for the management of the Arctic Range, the Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service, which has managerial responsibility for the Range, must give first consideration to the provisions of the Executive Order which established the Range "for the purpose of preserving unique wildlife, wilderness and recreation values" (Appendix E).

Generally each of the land areas administered by the U. S. Fish and

Wildlife Service is to provide for a specific wildlife population. "Wilderness areas"[1] and corresponding uses are not considered as basic goals for management except where wilderness habitat is a requirement of a certain species. By far the greatest preponderance of wildlands administered by the Fish and Wildlife Service is within the national wildlife refuges (Bureau of Sport Fisheries and Wildlife, 1960). While portions of some of the larger more isolated national wildlife refuges may have wilderness characteristics, management of such areas for the benefit of wildlife, including the manipulation of habitat and other environmental factors, is the paramount consideration.

In addition to these policies the Service recognizes the value of preserving, for study purposes, selected representative ecological units within certain refuges. For example, a number of so-called natural timbered areas have been set aside in conjunction with criterion established by the Society of American Foresters. Other areas such as native grasslands are being preserved on refuges in as natural a condition as possible with the exception of fire protection which is, of course, provided (ibid.).

Regional Director Nelson (1961) made the following comments regarding future management of the Range:

> Our Bureau has been concerned primarily with waterfowl refuges, big game ranges, and biological investigation, and here comes a 8,900,000 acre garden that we are to administer with all of these interests. The Bureau has the responsibility to consider all the

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[1]Wilderness areas are generally defined as being at least 100,000 acres in size and managed to provide an environment with unusual aesthetic or biological characteristics and an apparent lack of human impact sustained since primeval times (ORRRC Report 3, 1965).

> various facets. We are first concerned with the statements that exist in the Executive Order; those are paramount, and in fact, we cannot transcend the directives that are there. They do permit hunting and fishing; they do permit gas leasing; but they do not permit mining.....
>
> Now, if you can see the complex problems and interests in this Range you can see why we in the Bureau, at least those of us in Alaska, would not be committed until we have had the opportunity as we have heard this morning, the discussion of people who are interested. The Arctic Wildlife Range must, of necessity, be a composite of these interests. It cannot be something simply for the wilderness seeker. It is not purely wilderness area. It is not a game sanctuary. It is a composite of the interests that are involved....archaelogical and geological....its physical features as well as the fish and wildlife.

National Wilderness Preservation System. - - Under the provision of the Wilderness Act (Public Law 88-577) signed into law by President Johnson on September 3, 1964, slightly more than nine million acres were placed in the National Wilderness Preservation System (U. S. Department of the Interior, 1964). The purpose of this legislation is to assure that the increasing population and expanding developments do not occupy and modify all lands in the United States, but that some Federal lands be preserved and protected in their natural conditions. Such lands are to be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future enjoyment as wilderness. In addition to the original acreage established, this Act provides for review of millions of other areas for possible inclusion in the System.

The Arctic National Wildlife Range is by far the largest of all areas being considered for inclusion in the System (ibid.). Because of the compatibilities between the intent of the Wilderness Act and the provisions of the Executive Order establishing the Range, it is fitting that steps be made to place a significant portion of the Range within the National Wilderness Preservation System. The Arctic Range can contribute meaningfully to both

the acreage and quality of the lands that make up the System. In turn the System can help assure that a portion of the Arctic Range be maintained as one of the most "pure" of all wilderness areas in the United States.

The Problem of Conflicting Use

Earlier in this report the natural resources of the Arctic Range were described in some detail. Generally, Duerr (1960) has defined resources as scarce means for satisfying wants which human nature has proven to be insatiable. The resultant limitations put upon resources is obvious: limited supply, unlimited demand. The dissenting arguments and bitter struggles that accompanied the events leading to the establishment of the Arctic Range testify to the hopeless impossibility of providing enough resources to please everyone.

Generally all wildlands have recreational values of some kind. These values, in view of their importance to the public welfare, should be considered in any broad program of land use. On certain areas tangible natural resources such as timber, minerals, and hydroelectric power are of such economic importance that the public interest can best be served by a management program primarily oriented toward the sustained utilization of these commercial products. In such cases recreational values will be minimized, or perhaps completely eliminated. Conversely, on other wildlands recreational benefits are dominant, which means that the commercial use of natural resources, however well managed, should be greatly reduced or again, perhaps eliminated. Between these two extremes lie areas with natural resources which by wise management can satisfy both utilitarian and recreational needs. Though it is generally recognized that the Arctic Range is oriented away

from serving utilitarian needs, further clarification in determining the degree of compatibility between land uses is yet required.

The preservation of wildlife and wilderness values and the provision for mineral leasing represent the most divergent interests in developing a land use policy for the Arctic Range. Still much less divergent views complicate the picture. For example two may agree that recreation should be a primary goal of management but differ as to whether a wild animal should be shot or photographed.

Management Recommendations

The terms of the Executive Order establishing the Arctic Range provide "for the purpose of preserving unique wildlife, wilderness and recreation values....withdrawn from all forms of appropriation under public land laws, including mining but not the mineral leasing laws...".

The hiatus that a successful management plan must bridge as future use develops is a method allowing wilderness and wildlife values to co-exist with general recreation[2] and mineral leasing.

Following is a list of the major uses of the Range given in an order of decreasing compatibility:

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[2]In developing a land use plan for the Range it is appropriate to distinguish between general recreation and wilderness recreation. Elements of wilderness will pervade any and all activities in the Range, but the true wilderness recreation experience is reserved for those individuals who visit the most remote areas primarily for aesthetic and spiritual values. The general recreationist includes the sightseer, fisherman, and hunter. Certainly these individuals will enjoy and appreciate the natural features of the Range, but their complete satisfaction, unlike the wilderness enthusiasts, is dependent upon accessory equipment e.g. firearms, fishing gear, trail shelter, etc.

1. Wilderness and wildlife values
2. Wilderness recreation
3. Scientific studies
4. General recreation
5. Mineral leasing

It is pointed out that in the above list scientific studies are of intermediate compatibility. Unlike the other uses which have definite requirements of, or effects on, the environment, scientific studies can be generally designed so as to be compatible with any of the other major uses. On either side of scientific studies is a group of two uses: the first group, wilderness and wildlife values and wilderness recreation, can be said to occupy a defensive position relative to the objectives of the Executive Order, and the second group, general recreation and mineral leasing, can be said to occupy an offensive position. According to the Executive Order the Arctic Range is "for the purpose of preserving" its environmental conditions as generally existed at the time of establishment which was in 1960. This would indicate that the overriding tone of a plan for the Range must be defensive if the environmental conditions as existed in 1960 are to be maintained. Maintenance would be impossible if restraints were not applied to the offensive and competitive forces of general recreation and mineral leasing, which, however, must also be incorporated into a management plan as provided by the Executive Order. The question then becomes one of how much restraint on these offensive forces.

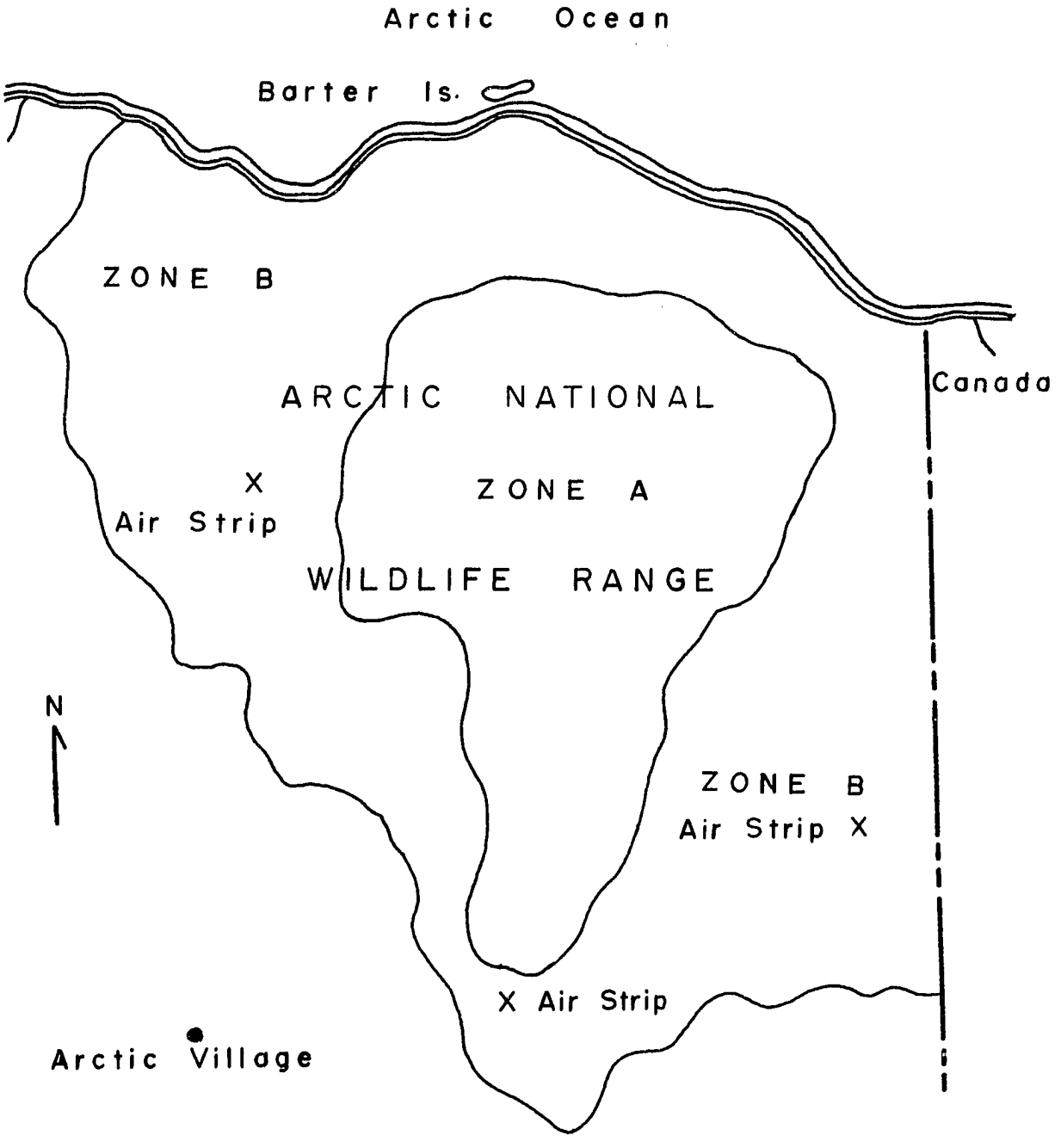
This determination of how much restraint to maintain the environmental conditions of the Range should be resolved by a select group of three or four ecologists well acquainted with the northern Alaska ecosystems. It is recommended that such a group make periodic (perhaps every five years) field studies and submit a report to the Bureau of Sport Fisheries and Wildlife

recommending as necessary, appropriate steps to prevent changes in the ecology of the Range. These reports would treat such things as the effects, of mineral exploration on the landscape, of hunting pressure on wildlife populations, of concentrations of recreationists on vegetative cover, etc.

To further reconcile the problem of competing and conflicting uses in the Arctic Range, a zoning system is recommended. This system is drawn to include only two general areas: Zone A, the Wilderness Zone, and Zone B, the Outside Zone.

Zone A, Wilderness Zone. - - The Wilderness Zone as shown in Fig. 15 includes that portion of the Arctic Range between the Hulahula River and the Kongakut River with its north boundary following generally a line at the 600-foot contour interval between the two rivers. The southeastern boundary is described by a line from where the Kongakut River bends toward the coast to the Sheenjek River below Table Mountain. The remaining boundary of Zone A is marked by the east bank of the Sheenjek River to the head of the Hulahula River across the Brooks Range divide.

This Wilderness Zone of approximately 3,500,000 acres is recommended for inclusion in the National Wilderness Preservation System. Such a designation would be in accord with the provision of the Wilderness Act (Sec. 3 (c)) which provides that the Secretary of the Interior review within ten years of enactment of the law, the national wildlife refuges to determine their suitability or non-suitability for preservation as wilderness. The purposes of the Wilderness Act are found to be supplemental to the purposes for which the Arctic Range was established. Secretary of the Interior Udall (1964) points out that when areas from the National Wildlife Refuge System are examined for inclusion in the Wilderness System "the need for




Zone A Wilderness Zone

Zone B Outside Zone

X Proposed Air Strip

Figure 15· MAP SHOWING THE TWO MANAGEMENT ZONES.
Scale 1:1,584,000

protection of the wildlife for which the areas were set aside will receive first consideration". A high degree of compatibility does exist between wilderness preservation and the protection of wildlife species especially when these species require a wilderness environment as is the case in the Arctic Range.

Because of its arctic character, remote location, and large size, the Wilderness Zone of the Arctic Range can contribute substantially to the quantity and quality of the National Wilderness Preservation System. This area provides Alaska an opportunity to enter the largest of all previously designated areas to the Wilderness System. It is only proper that Alaska with its millions of acres of wildlands supply such wilderness for use of all residents of the United States. This use can take the form of actual physical involvement for those few people who seek qualities of challenge, mystery, fascination, and tranquility in the wilderness, or use can be the mere recognition by the American people that such pristine areas as the Arctic Range do exist: this knowledge of existence then becomes a source of gratification for many individuals even though they never see such areas.

A provision of the Wilderness Act, (Sec. 4 (c) states:

> Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there should be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of transport and no structures or installation within any such area.

The Wilderness Zone will not be subject to heavy use within the immediate

future because of its relative inaccessibility. Only a few parties each year are expected to participate in the rigorous foot travel necessary to reach and explore Zone A. Parties using this Zone will for the most part gain access from the Lake Peters area or from Sheenjek Lake where float planes can be accommodated. Other more remote access points exist along the arctic coast to the north. This purposeful design of inconvenient access is necessary to insure that only those interested in the "ultimate" wilderness experience use this Zone, which is in keeping with wilderness preservation. Laycock (1965) writes that "heavy public use soon strips away the wild character of a refuge area. People are the enemy of wilderness."

Those individuals seeking a wilderness experience in Zone A would be knowledgeable as to their responsibility for protecting the area. Only the minimum of regulations need be imposed on these wilderness enthusiasts.

All users of Zone A would register at field stations to be located at Lake Peters and Sheenjek Lake to indicate specific information about their trip.

Within this Zone there would be no air strips, no trail shelters, no buildings, no hunting with firearms, and restrictions on low flying aircraft. Generally any scientific study would adhere to these same requirements.

The delineation of Zone A was determined so as to avoid those areas in the southeast portion of the Range that reportedly support mineral deposits (Committee on Interstate and Foreign Commerce, 1960, p. 226, 250, 275). Also those most accessible areas that offer potential for sheep hunting have been excluded from the Zone. The Zone does include portions of all three

physiographic designations to be found in the Range.

Any mineral exploration or related survey work to be conducted in the Wilderness Zone would be the responsibility of the U. S. Geological Survey.

Zone B, Outside Zone. - - Around the Wilderness Zone there exists the Outside Zone, Zone B, which includes approximately 5,500,000 acres. Three air strips are recommended for construction in this Zone to increase the accessibility of the Range for recreation, scientific, and mineral exploration purposes. One air strip is recommended for the southwest portion of the Range near Sheenjek Lake. Another is proposed for a location near the Firth River, and a third would be located on the northwest side of Lake Schrader. Lake Peters, Lake Schrader, and Sheenjek Lake can accommodate aircraft equipped with floats but it is highly desirable to develop year around air transportation facilities. The strips at Sheenjek Lake and Firth River are especially desirable for flights originating in Fort Yukon and Fairbanks as weather conditions are much more favorable for flying on the south slope than from the Brooks Range northward to the Arctic Coast. A commercial air strip is located at Barter Island that could serve aircraft flying in the north part of the Range.

Service buildings are recommended for construction at each of the three air strips within the Range. These buildings would serve as terminals for supplies for all users of the Range.

It is recommended that the Bureau of Sport Fisheries and Wildlife employ seasonal personnel to be assigned to each of the field stations to counsel and police recreationists in their use of the Range. Such personnel could check in all users, who in turn would file a "hike plan" of their

proposed trip or activity whether it be in Zone A or Zone B. This procedure could help control the areas to be used; also the direct contact could be used to acquaint the user with policies on waste disposal, fuel supply, fish and wildlife regulations, and other possible problem matters that ultimately must be dealt with. As suggested earlier, such problems are not anticipated within Zone A in the near future, but will be attendant to the population concentrations attracted to Zone B.

Other smaller lakes and river bars in Zone B could accommodate smaller aircraft, but it is expected that most of the use will be directed toward the scenic Lake Peters area. This area is the one area of the Range that will likely experience first overuse. Special effort will be required by management to protect this area.

Trip 1 (p. 38) or one of its alternative routes could be developed for general use from a terminal point at Lake Peters. A system of trail shelters could be constructed of natural stone. A distance of 10 to 12 miles between shelters would seem reasonable.

The air strips at Sheenjek Lake and Firth River will provide access points for use of foldboats and canoes in the Sheenjek and Firth drainages, respectively.

Though construction of air strips with appropriately designed and constructed service buildings might seem incredible from the standpoint of the "pure" wilderness enthusiasts, such development is essential to overcome the very real problem of access and to best fulfill public needs of the future.

Besides the opportunities afforded the general recreationists and

sportsmen, such development would have the benefit of allowing management to guide and thus better control the future use of the unique Arctic Range resources.

Questions 11, 12, and 13 (Appendix C) were used to gather opinions from the interested public regarding a recreation management policy for the Arctic Range. The following results were tallied relative to the use of guides, construction of shelters, and the building of air strips:

| | Yes | No |
|---|---|---|
| Guide Service | 109 | 96 |
| Trail Shelters | 149 | 61 |
| Air Strips | 71 | 130 |

The tally of results by organization (excluding the Green Mountain Club):

| Guide Service | Yes | No |
|---|---|---|
| Sierra Club | 46 | 51 |
| Adirondack Mountain Club | 40 | 28 |
| National Campers and Hikers Assoc. | 23 | 11 |

| Trail Shelters | Yes | No |
|---|---|---|
| Sierra Club | 46 | 51 |
| Adirondack Mountain Club | 58 | 13 |
| National Campers and Hikers Assoc. | 31 | 5 |

| Air Strips | Yes | No |
|---|---|---|
| Sierra Club | 32 | 71 |
| Adirondack Mountain Club | 22 | 42 |
| National Campers and Hikers Assoc. | 17 | 17 |

This group of outdoor recreationists questioned gave rather firm support

to the construction of trail shelters but indicate general objection to construction of air strips. Preferences regarding the use of guides are rather evenly divided. Answers supplied to this type of questioning reveal individual philosophies of recreational use in remote areas, and have aided in the formulation of my recommendations.

The extent and nature of any mineral deposits in northeastern Alaska are not generally known. Exploration is yet necessary to substantiate any significant claims. Certainly it would be unwise to attempt to enforce strict prohibition of all mineral exploration in the Range.

The original intent of Secretary Seaton's request for legislation to establish the Range was to escape the elimination of all mining activity as required by the Executive Order. Leffler (1960), formerly Assistant Secretary of the Interior for the Fish and Wildlife Service, said:

> There was no reason why the minerals could not be removed, but it was desirable to do it under a leasing system whereby the man could come in remove the minerals, and the Federal government would still retain ownership to the land so it wouldn't be destroyed except what would be necessary for the removal of the minerals.

However as it turned out Congress refused legislation with the result that the Executive Order was issued to the detriment of any mining activity. Oil and gas leasing were still permitted.

Though indications point to possible oil fields throughout the Arctic Range, the areas adjacent to Canada and the Arctic Ocean give special promise of oil (Committee on Interstate and Foreign Commerce, 1960, p. 226, 250, 275). Exploration in these areas could be conveniently served by the air strip proposed for the Firth River and by the existing air strips along the coast.

It is recommended that the oil exploration in the Arctic Range be organized so that one cooperatively financed private organization do the

work and thus eliminate the need for a great number of speculators probbing around. The Bureau of Sport Fisheries and Wildlife has established a set of permit conditions for surface geological study in the Arctic Range (Dean, op. cit.). These conditions follow:

1. This permit is issued for surface geological work only and not for the use of any equipment involving terrain or vegetation damage.

2. This permit is issued for the use of aerial transportation only. The use of surface vehicles is not authorized.

3. The issuance of this permit implies no intent on areas to be closed or open to subsequent gas and oil exploration or leasing under regulations to be issued.

4. The permittee will provide, prior to the start of field operations, a description or chart of the area where work will be conducted at the time during which field operations will be undertaken.

5. The permittee will designate a local agent employed by the permittee upon whom may validly be served written orders or notices respecting all matters concerned with this permit.

6. The permittee will notify the Refuge Supervisor of the location of proposed camps before entry into the area. On or before November 1, the permittee will report the location of each camp used during the season.

7. All refuse, debris, fuel cans, garbage, etc. will be removed from the Range prior to the conclusion of field operations.

8. All terrain and vegetation damage will be repaired to the satisfaction of the Refuge Supervisor or his representative.

9. Prior to the start of field operations, the permittee will post a bond in the amount of $10,000 to cover acts of negligence, fire, camp clean-up, terrain and vegetation damage and disposal of refuge.

10. A report will be appreciated covering significant wildlife observations and items of archaeological interest as noted by field parties during the summer's work.

Though these conditions are rather simple and straightforward, they are commensurate with the type of survey work to be carried out in the Range during the next years.

## SUMMARY

On December 6, 1960, Secretary of the Interior, Fred A. Seaton, created by Executive Order the 8,900,000-acre Arctic National Wildlife Range in northeast Alaska. This enactment was preceded by months of political and legal controversy between the state's rightest and the bureaucrat, the miner and the conservationist.

Directives of the Executive Order specified that the Bureau of Sport Fisheries and Wildlife, United States Fish and Wildlife Service, was administratively responsible for the management of the various natural resources of the area.

In view of the economic and social impact of the rapidly growing outdoor recreation industry in the United States, this study investigated the recreational potential of the Arctic National Wildlife Range. Specific objectives were (1) to determine the magnitude of the recreational resource, (2) to determine public demand for this resource, and (3) to determine how recreational use of the Range could be made compatible with other land uses.

Its rich scenic and natural features and the remote location and pristine character of the Arctic Range cause it to be particularly attractive to outdoorsmen. Some 42 days of field experience verified the positive recreational value of the Range during the summer months. Feasible activities include back-packing, mountain climbing, photography, canoeing, hunting, and fishing.

The minimum cost for two people to spend ten days in the Range is approximately 450.00 dollars (includes round-trip transportation from

Fairbanks).

Returned questionnaires from a selected group of outdoor recreation enthusiasts indicated that 18 per cent of these people would be willing to expend at least 200.00 dollars per person to visit the Arctic Range.

A land use plan for the Arctic National Wildlife Range must accommodate a broad scope of possible uses, from oil leasing to "pure" wilderness use. Presently, insufficient field experience and limited scientific knowledge does not justify a detailed land use plan. Current management planning should only provide a framework to guide developing trends.

It is recommended that a zoning system be utilized for management planning. This system designates two major use areas, Zone A to be included in the National Wilderness Preservation System, and Zone B to be oriented toward more utilitarian uses.

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## APPENDIX A

The resolution as adopted by the Tanana Valley Sportsmen's Association at its regular meeting May 14, 1957.

### Resolution

Whereas Alaska contains the only Arctic and subarctic areas under U. S. jurisdiction, and

Whereas the eastern Brooks Range area is typical of the Alaska Arctic and subarctic, and

Whereas the eastern Brooks Range contains comparatively small amounts of known mineral resources the development of which would conflict with the recreational use, and

Whereas the area possesses unique and increasingly necessary opportunities for recreational use, and

Whereas recreational values are impaired by uncontrolled exploitation: Now, therefore, be it

Resolved, That the Tanana Valley Sportsmen's Association urge the Bureau of Sport Fisheries and Wildlife to initiate the establishment by the Secretary of Interior of an Arctic Wildlife Range to preserve these recreational values; be it further

Resolved, That the Arctic Wildlife Range consist of the area shown on the attached maps (generally bounded by the Arctic Ocean, the Canning and East Fork of the Chandalar Rivers, the Canadian boundary and lying north of 68° N. latitude), and administered according to the policies outlined on the attached sheet.

### Suggested Plan of Administration and Regulations

1. Designate the area (see map) as the Arctic Wildlife Range (a designation comparable to the Kenai National Moose Range) and as soon as this is accomplished take all appropriate steps to have the designation shown on all future editions of applicable Alaska maps issued for administrative and for public use by both Government and private agencies (including oil company maps).
2. Retain under present BLM administration for the present but as soon as possible vest responsibility for wildlife research, investigations, management, protection, and the enforcement of wildlife regulations, in the Bureau of Sport Fisheries and Wildlife of the Fish and Wildlife Service.
3. Legitimate prospecting and mining operations to be unrestricted except that surface use of mining claims to be limited to purposes of bona fide mineral exploration, development and removal.
4. Hunting and trapping to be unrestricted except by the applicable territorial regulations prevailing in comparable areas (and to the further restrictions as to construction of roads, and use of aircraft, outlined under 6).
5. Wilderness recreation and scientific study programs to be encouraged

and promoted subject only to the maintenance of undisturbed ecological conditions in designated research areas and to the preservation of wilderness conditions essentially unimpaired throughout the entire area.

6. The use of aircraft for trapping, or for hunting, fishing or other recreational purpose to be prohibited except as permitted by the administrative agency; the use of rotorcraft or automobile or tracked vehicles to be entirely prohibited for trapping or hunting, fishing or other recreational purpose. As a matter of policy, the use of automobile or tracked vehicles for any purpose shall be discouraged, and entirely prohibited except as may be permitted by the administrative agency for mineral development (but not prospecting) and defense purposes, with such permitted use restricted to minimum of specific routes and areas.

7. Establish wildlife protection policies and programs that will maintain the flora, fauna, and ecological conditions intact with a minimum of management. The one species that has been exterminated, the muskox, to be restored, and studies made to ascertain the best methods for its perpetuation and protection.

# APPENDIX B

A Bill (S. 1899) introduced in the Senate of the United States to authorize establishment of the Arctic Wildlife Range. 86th Congress, 1st Session, May 11, 1959.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to preserve, in the public interest, a magnificent wildlife and wilderness area in the State of Alaska, the Secretary of the Interior is hereby authorized to establish a particular area in the State as the "Arctic Wildlife Range," hereafter referred to as the "wildlife range."

SEC. 2. Establishment of the wildlife range shall be effective following the publication of an order of the Secretary of the Interior to that effect in the Federal Register, and any subsequent revisions in the boundary of such area, subject to the limitations hereafter prescribed, shall be accomplished in the same manner. However, the exterior boundaries of the area that may be set aside for the purposes of this Act are hereby delimited to the general area which is bounded on the north by the Arctic Ocean, on the east by the Canadian boundary, on the west by the Canning River, and which extends southward to include a portion of the south slope of the Brooks Range, State of Alaska, lying southeasterly from the headwaters of the Canning River across the East Fork of the Chandalar River, along Old Woman Creek to the confluence of Monument Creek and the Sheenjek River and easterly along Bilwaddy Creek to the Canadian border.

SEC. 3. (a) The Secretary of the Interior shall administer and manage the wildlife range in a manner that he finds to be in the public interest: Provided, however, That the conduct of any present or future national defense activities shall not be affected thereby, without the concurrence of the Secretary of Defense.

(b) All mineral deposits in the wildlife range, of the classes and kinds subject to location, entry, and patent under the mining laws and subject to leasing under the mineral leasing laws of the United States, shall be, exclusive of the land containing them, subject to disposal under such laws. However, a patent issued for such mineral deposits shall not convey any interest in the surface of the land containing such minerals other than the right of occupation and the use of so much of the surface of the land as may be required for purposes reasonably incident to the mining or removal of such minerals under such regulations as may be issued by the Secretary of the Interior, and appropriate reservations shall be inserted in any mineral patent that may be issued hereunder for the aforesaid purposes.

(c) The Secretary of the Interior is authorized to permit the hunting and the taking of game animals, birds, and fish in the wildlife range, or parts thereof, as well as the trapping of fur animals. However, no persons may hunt, trap, capture, kill, or willfully disturb any wild mammal, wild bird, or fish or take or destroy the eggs or nests of any such bird or fish within the wildlife range, except as may be prescribed by the Secretary.

(d) The Secretary is authorized to administer the wildlife range in accordance with this Act and such regulations as he may issue in the public interest relating to any of the purposes and provisions of this Act.

(e) Any employee of the Department of the Interior authorized by the Secretary of the Interior to enforce the provisions of this Act shall have power (1) without warrant, to arrest any person committing in the presence of such employee a violation of this Act or any regulation made pursuant thereto, and to take such person immediately for examination or trial before any officer or court of competent jurisdiction, and (2) to execute any warrant or other process issued by any officer or court of competent jurisdiction to enforce the provisions of this Act or regulations made pursuant thereto. Any judge of a court established under the laws of the United States, or any United States Commissioner may, within his respective jurisdiction, upon proper oath or affirmation showing probable cause, issue warrants in all such cases. Any wild mammals, wild birds, fish or other property within or relating to such wildlife range, when illegally taken or possessed shall, when found by such employee, or by any marshal or deputy marshal, be summarily seized by him, and upon conviction of the offender, such property shall be forfeited to the United States and disposed of as directed by the court having jurisdiction. Any person who violates or fails to comply with any provision of this Act or any regulation made pursuant thereto shall be fined not more than $500 or imprisoned not more than six months, or both.

SEC. 4. Nothing in this Act shall be construed to impair the authority of the President under section 10 of the Act of July 7, 1958 (72 Stat. 339,345).

APPENDIX C - 1

Letter introducing questionnaire to members of the Sierra Club, Adirondack Mountain Club, the Green Mountain Club and the National Campers and Hikers Association.

ALASKA COOPERATIVE WILDLIFE RESEARCH UNIT

University of Alaska
College, Alaska

November 8, 1962

Dear Fellow Outdoorsman:

The U. S. Fish and Wildlife Service in cooperation with the University of Alaska is undertaking a study aimed at developing an adequate management plan for the recreational use of the Arctic National Wildlife Range.

We feel that the interested outdoorsman throughout the nation can be of great assistance in formulating this recreational plan. You are being asked to aid us.

Our request is that you read the attached information and fill out the enclosed questionnaire. The completed questionnaire should then be returned to us in the enclosed self addressed envelope.

We will be most appreciative of your sincere response to this study.

Sincerely,

Darrell Watt

DW/wj

APPENDIX C - 2

Background material on the Arctic Range which accompanied the questionnaire.

## THE ARCTIC NATIONAL WILDLIFE RANGE

The Arctic National Wildlife Range is a nine million acre wilderness area located in the remote northeast corner of Alaska. On the north, the area is contiguous with approximately 130 miles of the Arctic Ocean while the Canadian border designates the eastern boundary.

The Range was set aside by an Executive Order (Dec. 1960) of the Secretary of the Interior, "to provide a wildlife management area and to preserve the area for scientific and collateral recreation and wilderness values".

The Arctic National Wildlife Range provides a wild area unequaled in our nation. The eastern portion of the rugged, geologically recent, Brooks Mountain Range divides the Wildlife Range into two distinct topographic areas. The north slope is composed of a rolling expanse of arctic tundra, whereas on the south, steeper slopes support the boreal forests typical of subarctic regions. Within the Range, picturesque mountain glaciers occur, the highest glacial peak being Mt. Michelson (El. 9,239 ft.). Numerous species of wildlife inhabit the area in varying degrees of density. Big game animals include the grizzly bear, caribou, moose, Dall sheep, and along the coast the polar bear. Other mammals are the wolf, arctic fox, red fox, muskrat, ground squirrel, and many small rodents. A wide variety of bird species are present. Some of the more interesting include the golden eagle, robin, northern shrike and the gyrfalcon. An abundance of waterfowl also nest in the area.

Such a large, inviolate, area can contribute much to the advancement of scientific studies in the North American arctic. Additionally, a definite outdoor recreation potential exists in this pleasantly remote area. Potential activities include canoeing, mountain climbing, backpacking, photography and limited hunting and fishing.

Facilities and accommodations in the area are non-existent. The more hardy and adventurous outdoorsman will be able to most fully utilize this area. He must be prepared to navigate in a country where a map is the only guide and where caribou have been the only trail crew.

Most of the recreational activity would be confined to the summer months. During July and August temperatures are generally within a range of 45° F. - 65° F., though extremes can vary twenty degrees either way. Light rain showers are a common occurrence, though annual rainfall does not exceed 15 inches.

Transportation to the Range is primarily by float plane from Fairbanks. Only three or four lakes are able to accommodate craft in the Cessna 185 class, though many scattered smaller lakes would accommodate a two-man aircraft. Those seeking a near ultimate in outdoor recreation could, by using a river boat, push into the Wildlife Range via south flowing tributaries of the Yukon River.

APPENDIX C - 3

Questionnaire used to assist in development of management plan for the Arctic Range.

QUESTIONNAIRE

Circle the correct answer:

1. Sex: (a) female (b) male

2. Age: (a) 25 or less (b) 26-49 (c) 50 & over

3. Residence:
   (a) New England and Mid-Atlantic
   (b) Mid-West (Ohio, Ind., Ill., Mich., Wis., Minn., Iowa, Mo.)
   (c) South (southern states incl. Va., Ky., Ark., and Texas)
   (d) Plains and West

4. Education: (a) not completed high school (b) high school (c) college

5. Have you heard of the Arctic National Wildlife Range? (a) yes (b) no

6. Is it possible that you will make a trip to Alaska within the next five years?
   (a) yes (b) no

7. What would be the greatest monetary amount you would be willing to pay for an all expense round trip to the Arctic Range from Fairbanks?

   (a) not interested (b) $50 (c) $100 (d) $200 (e) $300 (f) $400 +

   (If answer is other than "not interested", skip to Question 9. For those checking "not interested", please answer Question 8.)

8. How would you classify your reason for having no interest in a trip to the Arctic Range?

   (a) Could not afford such a trip after the expenditure necessary to reach Fairbanks.

   (b) More interested in other natural areas of Alaska, such as Mt. McKinley, Katmai National Monument, Point Barrow etc.

   (c) Other. Specify: _____

   _____

(For those answering question 8, please consider this questionnaire complete aside from any possible comments you may wish to make.)

9. How long would you desire to stay in the area?

   (a) 1-2 days (b) 3-7 days (c) 1-3 weeks (d) 3 weeks or more

10. What activities would you be most interested in? Those included are:

| | | |
|---|---|---|
| hunting | fishing | mountain climbing |
| canoeing | back-packing (camping) | photography |
| scientific investigation | | |

   (List three in order of decreasing interest)

   (a)_____(activity of most interest)

   (b)_____

   (c)_____

11. Would you prefer to have a competent guide accompany you during your Arctic Range venture? (a) yes (b) no

12. Would you favor shelters being constructed along the trails which will be more commonly used?
   (a) yes (b) no

13. Would you favor increasing the accessibility of the Arctic Range by constructing a conservative number (3-5) of air strips to accommodate wheeled aircraft? (a) yes (b) no

COMMENTS:

APPENDIX C - 4

Results from the questionnaire C - 3.

| | | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|
| 1 | Sex | 59 | 228 | - | - | - | - |
| 2 | Age | 9 | 156 | 117 | - | - | - |
| 3 | Residence | 130 | 40 | 4 | 115 | - | - |
| 4 | Education | 7 | 50 | 232 | - | - | - |
| 5 | Heard of ANWR | 171 | 117 | - | - | - | - |
| 6 | Possible trip | 191 | 96 | - | - | - | - |
| 7 | Expenditure | 90 | 9 | 45 | 58 | 33 | 36 |
| 8 | Reason | 42 | 31 | 41 | - | - | - |
| 9 | How long | 3 | 53 | 115 | 30 | - | - |
| 10-1 | Hunting | 5 | 8 | 3 | - | - | - |
| 10-2 | Canoeing | 14 | 29 | 38 | - | - | - |
| 10-3 | Science | 15 | 16 | 20 | - | - | - |
| 10-4 | Fishing | 17 | 25 | 31 | - | - | - |
| 10-5 | Back-packing | 104 | 52 | 13 | - | - | - |
| 10-6 | Mountain climbing | 35 | 23 | 35 | - | - | - |
| 10-7 | Photography | 33 | 60 | 49 | - | - | - |
| 11 | Guide | 109 | 96 | - | - | - | - |
| 12 | Shelters | 149 | 61 | - | - | - | - |
| 13 | Air strips | 71 | 130 | - | - | - | - |

## APPENDIX D - 1

Questions from a personal questionnaire survey conducted in the City of Fairbanks, Fall of 1962. (Individuals interviewed were from a five per cent sample of city households).

14. Are you acquainted with the Arctic National Wildlife Range?
    (a) Yes (b) No

15. Would a trip to the Range interest you?
    (a) Yes (b) No

16. If so, what amount of money would you be willing to exchange for such a trip?
    (a) $50 (b) $100 (c) $200 (d) $300 (e) $400 +

## APPENDIX D - 2

Answers to questions shown in D - 1.

14. (a) 95 (b) 99

15. (a) 106 (b) 86

16. (a) 34 (b) 36 (c) 20 (d) 8 (e) 18

APPENDIX E

Public Land Order establishing the Arctic National Wildlife Range according to provisions of the Executive Order No. 10355.

ESTABLISHING THE ARCTIC NATIONAL WILDLIFE RANGE

By virtue of the authority vested in the President, and pursuant to Executive Order No. 10355 of May 26, 1952, it is ordered as follows:

1. For the purpose of preserving unique wildlife, wilderness and recreational values, all of the hereinafter described area in northeastern Alaska, containing approximately 8,900,000 acres is hereby, subject to valid existing rights, and the provisions of any existing withdrawals, withdrawn from all forms of appropriation under the public land laws, including the mining but not the mineral leasing laws, nor disposals of materials under the Act of July 31, 1947 (61 Stat. 681; 30 U. S. C. 601-604), as amended, and reserved for use of the United States Fish and Wildlife Service as the Arctic National Wildlife Range; . . . . . .

2. The Secretary of the Interior is authorized to permit the hunting and the taking of game animals, birds, and fish in the wildlife range or parts thereof, as well as the trapping of fur animals. However, no person may hunt, trap, capture, kill, or willfully disturb any wild mammal, wild bird, or fish or take or destroy the eggs or nests of any such bird or fish within the wildlife range, except as may be prescribed by the Secretary. The provisions of State law shall govern all hunting and taking of wildlife which the Secretary of the Interior permits under the terms of this order.

Fred A. Seaton,
Secretary of the Interior

December 6, 1960